# The EDISON ELECTRIC INSTITUTE BULLETIN

July
1953

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GEOGRAPHY & INDUSTRY

## EEI Convention Issue

*B. L. England*
*Eugene S. Loughlin*
*D. W. Tracy*
*Edward T. McCormick*
*Marvin Chandler*
*Grover C. Neff*
*Dr. Horace Hildreth*
*Ashton B. Collins*
*J. R. Hartman*
*Charles E. Oakes*
*W. W. Lynch*
*Louis V. Sutton*
*N. B. Gussett*
*C. N. Phillips*
*Gordon Dean*
*John R. Dunning*
*Walker L. Cisler*
*Edgar H. Dixon*

*Walter H. Sammis*

Published Monthly by
Edison Electric
Institute

# ELECTRICAL RESEARCH STATISTICS
# THE ELECTRIC LIGHT AND POWER INDUSTRY

## *Current Statistical Data Covering 100 Per Cent of Industry*

*March, 1952-1953*

### SOURCE AND DISPOSAL OF ENERGY—MONTH OF MARCH

| | 1953 | 1952 | % |
|---|---|---|---|
| **GENERATION* (Net)** | | | |
| By Fuel Burning Plants | 26,771,450,000 | 22,597,012,000 | +18.5 |
| By Water Power Plants | 10,197,381,000 | 10,442,691,000 | − 2.4 |
| **Total Generation** | **36,968,831,000** | **33,039,703,000** | **+11.9** |
| Add—Net Imports Over International Boundaries | 151,551,000 | 180,809,000 | −16.2 |
| Less—Company Use | 127,286,000 | 116,400,000 | + 9.4 |
| Less—Energy Used by Producer | 655,611,000 | 685,653,000 | − 4.4 |
| **Net Energy for Distribution** | **36,337,485,000** | **32,418,459,000** | **+12.1** |
| Lost and Unaccounted for | 4,673,369,000 | 3,951,173,000 | +18.3 |
| **Sales to Ultimate Customers** | **31,664,116,000** | **28,467,286,000** | **+11.2** |

### CLASSIFICATION OF SALES

| | | | |
|---|---|---|---|
| **NUMBER OF CUSTOMERS—As of March 31** | | | |
| Residential or Domestic | 40,951,432 | 39,547,057 | + 3.6 |
| Rural (Distinct Rural Rates) | 1,619,279 | 1,645,129 | − 1.6 |
| Commercial or Industrial: | | | |
| Small Light and Power | 5,634,767 | 5,537,642 | + 1.8 |
| Large Light and Power | 259,551 | 246,833 | + 5.2 |
| Other Customers | 157,890 | 163,569 | − 3.5 |
| **Total Ultimate Customers** | **48,622,919** | **47,140,230** | **+ 3.1** |
| **KILOWATTHOUR SALES—During Month of March** | | | |
| Residential or Domestic | 8,382,718,000 | 7,552,935,000 | +11.0 |
| Rural (Distinct Rural Rates) | 682,708,000 | 541,128,000 | +26.2 |
| Commercial or Industrial: | | | |
| Small Light and Power | 5,345,379,000 | 4,948,817,000 | + 8.0 |
| Large Light and Power | 15,684,074,000 | 13,878,696,000 | +13.0 |
| Street and Highway Lighting | 325,026,000 | 298,613,000 | + 8.8 |
| Other Public Authorities | 733,612,000 | 710,436,000 | + 3.3 |
| Railways and Railroads: | | | |
| Street and Interurban Railways | 259,375,000 | 293,985,000 | −11.8 |
| Electrified Railroads | 202,227,000 | 209,554,000 | − 3.5 |
| Interdepartmental | 48,997,000 | 33,122,000 | +47.9 |
| **Total to Ultimate Customers** | **31,664,116,000** | **28,467,286,000** | **+11.2** |
| **Revenue from Ultimate Customers** | **$560,605,500** | **$506,202,900** | **+10.7** |

### RESIDENTIAL OR DOMESTIC SERVICE

| | | | |
|---|---|---|---|
| **AVERAGE CUSTOMER DATA—For 12 Months ended March 31** | | | |
| Kilowatthours per Customer | 2,209 | 2,053 | + 7.6 |
| Average Annual Bill | $60.97 | $57.32 | + 6.4 |
| Revenue per Kilowatthour | 2.76¢ | 2.79¢ | − 1.1 |

* By Courtesy of the Federal Power Commission.

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*The objectives of the Edison Electric Institute are:*

The advancement in the public service of the art of producing, transmitting, and distributing electricity and the promotion of scientific research in such field.

The ascertainment and making available to the members and the public of factual information, data, and statistics relating to the electric industry.

To aid its operating company members to generate and sell electric energy at the lowest possible price commensurate with safe and adequate service, giving due regard to the interests of consumer, investor, and employee.

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*The* EDISON ELECTRIC INSTITUTE BULLETIN

*July, 1953*

Vol. 21 No. 7

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## WALTER H. SAMMIS

*Newly Elected President of the Edison Electric Institute*

*The* EDISON ELECTRIC INSTITUTE
BULLETIN

# Industry Responsibilities and Opportunities Theme for Annual EEI Convention

***Recent Meeting the Largest in Institute History***

RETIRING Institute President B. L. England set the theme for the Twenty-First Annual EEI Convention, Atlantic City, June 1-4, at its opening session when he declared that the industry had "great work to do, great decisions to make, important policies to establish, much commercial development work to accomplish, awe-inspiring engineering opportunities ahead," and heavy responsibilities in matters of finance and in relations with government and the public in general.

This theme of unlimited opportunity and heavy responsibility was evident during the following days of deliberation when forthright examination of major phases of company operations made clear the industry's determination to insure fair competition from government proprietary business; to extend the advantages of electrical living through sound advertising and beneficial public relations activities; to guarantee stockholders adequate returns on their investments; to help develop service area resources to their fullest potential; to continue to provide the far-sighted leadership which has characterized the industry since its inception; and to make available the industry's vast experience and technological skill for the development of economically feasible electric power from atomic fuels.

The continued growth of the industry, Mr. England said, promises "a new era of electrical living." Accordingly, the convention's six general sessions were devoted to the advancement of the industry along many fronts and presented discussion of an unusually broad range of subjects, from utility regulation to the industry's place in the Atomic Age. Addressing the sessions was a group of 28 nationally prominent businessmen, industrialists, educators, government officials, and scientists, whose presentations appear in this issue of the BULLETIN, with the exception of the financial and leadership panels, which are available upon request to the Institute.

Serving to enrich the business sessions was the informal exchange of information among conferees facilitated by the attendance of more than 3000 delegates and guests, whose participation made the meeting memorable as the largest in Institute history.

Returning to the eastern seaboard after meeting in inland cities for the past two years, the convention was set against the backdrop of Atlantic City's delightful and justly famed ocean vista. Another famous Atlantic City attraction, the Miss Americt Pageant, was also delightfully represented by its 1953 winner, Miss Neva Jane Langley, who graciously welcomed delegates to the opening general session in Convention Hall.

Recalling that the industry helped dedicate Convention Hall 24 years ago during Light's Golden Jubilee, Miss Langley saluted the industry on behalf of American women for the "wonderful group of labor-saving devices which have brought to us the fruits of the power of electricity." "Yours is a great industry," she said, one that "affects the life of every person in our great nation," one that affects us "in our homes, in industry, and on the farm." "I know that you are going to meet every challenge that is thrown before you," she continued, "that you will certainly fulfill the obligations of the people of America."

Walter H. Sammis, President of Ohio Edison Co. and Chairman of the Board of Directors of Pennsylvania Power Co., was elected

## OFFICERS OF EEI

WALTER H. SAMMIS, *President*
Ohio Edison Company
Akron, Ohio

HAROLD QUINTON, *Vice President*
Southern California Edison Company
Los Angeles, California

H. S. BENNION, *Vice President and Managing Director*
420 Lexington Avenue
New York 17, New York

H. S. SUTTON, *Treasurer*
Consolidated Edison Company of New York, Incorporated
New York, New York

A. B. MORGAN, *Secretary and Assistant Managing Director*
420 Lexington Avenue
New York 17, New York

# NEW PRESIDENT OF THE INSTITUTE

WALTER H. SAMMIS, President of Ohio Edison Co. and Chairman of the Board of Pennsylvania Power Co., was elected President of the Edison Electric Institute at the Institute's Twenty-First Annual Convention, succeeding B. L. England, President of Atlantic City Electric Co. One of the nation's leading electric company executives, Mr. Sammis has served as Vice President of the Institute for the past year.

A native of Hempstead, Long Island, Mr. Sammis was graduated in electrical engineering from Columbia University in 1917, having been elected to Pau Beta Phi and Sigma Chi and awarded the Illig medal for scholarship. He had received his introduction to the utility business as an electrician's helper with Brooklyn Rapid Transit Co. and as a switchboard operator for Public Service Electric and Gas Co. during his summer vacations.

Following his final examinations, he enlisted in the Navy as a machinist, serving for 28 months, during which he rose to the rank of ensign. Upon his release from active service, he returned to Columbia University as an instructor in electrical engineering.

In 1920 he joined Consumers Power Co., serving in various engineering and power sales capacities until 1924. After brief association with C. H. Tenney & Co. on power sales and rate analysis work for utilities in New York and New England, he rejoined Consumers Power in 1925 as assistant to the vice president and general manager.

Four years later he became assistant to the vice president of Allied Power and Light Corp., a predecessor of Commonwealth & Southern Corp. In this position, he was identified with the operations of The Tennessee Electric Power Co., Consumers Power Co., and street railway and interurban bus companies in Michigan.

Mr. Sammis was elected a vice president and director of Consumers Power in 1932 and the following year was named to serve in the same capacities for Ohio Edison Co. and Pennsylvania Power Co. In 1936 he became president of Pennsylvania Power and two years later was made a vice president and director of Commonwealth & Southern. In 1944 he resigned from Commonwealth and also from Consumers to accept the presidency of Ohio Edison, at Akron. In 1950, he became chairman of the board of Pennsylvania Power Co.

From 1930 until their sale in 1943, he was also an officer and director of several transportation companies in Ohio and Pennsylvania and was president of their holding company, Transportation Securities Corp., from 1938 until its liquidation in 1943.

In late 1949, Ohio Edison became an independent company upon the dissolution of Commonwealth & Southern and, under Mr. Sammis' guidance, almost immediately acquired The Ohio Public Service Co. from Cities Service Co. The acquisition agreement was signed on November 10, 1949, and, after hearings before the SEC and Public Utilities Commission of Ohio, Cities Service's controlling interest of 2,000,000 of the outstanding 3,000,000 shares of Ohio Public Service common stock was acquired by Ohio Edison on December 23, 1949.

Because of many seemingly insurmountable legal and financial obstacles involved, the merger was considered an outstanding accomplishment in financial and industry circles.

Ohio Edison is the largest electric company in the state of Ohio and with its subsidiary, Pennsylvania Power, ranks among the first ten power systems retailing electric service in the nation. It now serves approximately 550,000 customers, and, for the 12 months ended April 30, 1953, its system's operating revenues were $104,191,077 and its assets, at that date, $457,770,252. The Ohio Edison System has a total generating capability of 1,234,000 kw in 14 power plants and has carried on extensive construction programs in the post World War II period to meet increasing demands for electricity. Construction expenditures totaled $197,000,000 for the seven years, 1946-52. System expenditures are estimated at $59,200,000 in 1953.

An outstanding achievement of the industry in 1952 was formation of the Ohio Valley Electric Corp. by 15 Ohio utilities, including Ohio Edison and Pennsylvania Power, to supply the entire 1,800,000-kw electric requirements of the AEC's gaseous diffusion plant being built in Pike County, Ohio. Two power plants to supply this load are now under construction by OVEC and its subsidiary, Indiana-Kentucky Electric Corp.

Mr. Sammis, who took an active part in the organization of Ohio Valley Electric and Indiana-Kentucky Electric, is a director and member of the executive committee of both corporations.

In Ohio he is also a director of the Cleveland & Pittsburgh Railroad Co., vice president of the Ohio Chamber of Commerce, and vice president and trustee of the City Hospital of Akron.

Active for many years in association affairs, he is a member of the American Institute of Electrical Engineers, a member of the Executive Committee of the Association of Edison Illuminating Companies, a member of the Sales Executive Conference, a director and one of the organizers of the Ohio Electric Utility Institute, a member of the DEPA Advisory Board, and has served as a director and member of the Executive Committee of the National Association of Electric Companies. One of the organizers of the Council of Electric Operating Companies that functioned during World War II, he is also active in the Electric Companies Advertising Program and the Electric Companies Public Information Program.

Mr. Sammis was elected 42nd alumni trustee of Columbia University in 1947, is a member of the trustee's Advisory Committee on investments, a former member of the trustee's Honor Committee and Development Committee, a former director of the Alumni Federation, and a former member and officer of the Board of Managers of Columbia Engineering School Alumni Association. In 1943 he was recipient of a medal "for conspicuous Columbia Alumni service" and in 1950 accepted chairmanship of a national committee whose object is to provide a new $13,000,000 Columbia engineering center.

Mr. Sammis' varied service with the Institute has included membership on the Board of Directors and the Advisory Committee.

President of the Institute at the convention, succeeding Mr. England, President of Atlantic City Electric Co. Upon being installed as new Institute chief executive at the Thursday morning general session, Mr. Sammis led delegates and guests in a vote of thanks to Mr. England for his untiring efforts on behalf of the Institute and the industry during the past year.

Harold Quinton, Executive Vice President of Southern California Edison Co., was elected EEI Vice President at the annual Meeting. Harold S. Sutton, Treasurer of Consolidated Edison Co. of New York, Inc., who has served as Treasurer of the Institute for the past two years, was re-elected to that post, and 15 member company executives were named to the EEI Board of Directors.

H. S. Bennion, Institute Vice President and Managing Director, was also re-elected to his post, as was A. B. Morgan, Institute Assistant Managing Director and Secretary.

### Prize Awards

On Wednesday morning in the Ballroom of Convention Hall, where all the general sessions were held, Harry Restofski, Chairman of the EEI Prize Awards Committee and Vice President of West Penn Power Co., conducted presentation of the Reddy Kilowatt Annual Report Award and the Claude L. Matthews Valor Award.

Referring to the competitions for which prizes were awarded earlier this year at the Annual EEI Sales Conference, Mr. Restofski said that "it has been gratifying to see the increase in the number of entries submitted for the commercial awards in the past few years. The total number of entries this year assures us not only of continued interest in the contests but, more important, of continued vigorous sales promotion by electric companies."

Before this morning's awards are presented, Mr. Restofski continued, "we of the Prize Awards Committee would like to pay tribute to all those companies and individuals who entered the various EEI contests, to the judges who labored long and conscientiously before coming to their decisions, and, of course, to the donors who so generously offered the awards. Whether or not they won, we are sure that the entrants who competed have been gainers both for themselves and their companies."

"The Prize Awards Committee," Mr. Restofski added, "urges small and medium-sized companies not to hesitate to enter one or more of the contests, because in nearly all instances there are special classes favoring these companies."

Sponsored by the Reddy Kilowatt Service and awarded each year to the electric company whose annual report best illustrates, humanizes, and simplifies company operations, the Reddy Kilowatt Annual Report Award Contest for 1952 was won by Arkansas Power & Light Co. The award was presented to R. E. Ritchie, President of Arkansas P&L.

Four electric companies receiving Honorable Mention Certificates were Pennsylvania Power & Light Co., last year's top winner; Gulf States Utilities Co.; Wisconsin Power & Light Co., recipient of an Honorable Mention Certificate last year; and Pacific Utilities Co. The presentations were made by Ashton B. Collins, Director of the Reddy Kilowatt Service.

William A. Cripps, Electric Repair Leader of Pennsylvania Power & Light Co., received the Claude L. Matthews Valor Award for 1952, which honors acts of devotion to duty wherein electric company employees display extraordinary courage in efforts to maintain important electric service or to restore such service in the shortest possible time. Making the presentation was Claude L. Matthews, President of the W. N. Matthews Corp., donor of the award.

Mr. Cripps' unusual act of valor took place on October 2, 1952, when a 66,000-v oil switch at PP&L's Shenandoah Substation failed and caught fire in a flash-over. While the substation operator tried to isolate the burning switch, Mr. Cripps singlehandedly attacked the blaze, despite the imminent danger of a second flash-over.

The PP&L crew leader exhausted all available fire extinguishers and then resorted to throwing dry chemicals on the fire by hand. His continuing actions kept the fire under control until additional equipment, through the substation operator's telephone calls, could be secured from other PP&L locations. Mr. Cripps' efforts made it possible to restore service quickly to lines affected by the fire and prevented partial loss of substation structure and adjacent equipment, thereby avoid-

HAROLD QUINTON

*Newly Elected Vice President of the Institute*

**HAROLD QUINTON, Executive Vice President and Director of Southern California Edison Co., was elected Vice President of the Edison Electric Institute at its Twenty-First Annual Convention in Atlantic City. He will hold office for the next year, succeeding Walter H. Sammis, who has assumed the presidency of the Institute.**

**Mr. Quinton has been an officer of Southern California Edison since 1942 when he was elected vice president in charge of finance. He was named a director of the company in 1945, executive vice president in 1948, and a member of the Executive Committee of the Board of Directors in 1949. He is also a director and vice president of the Los Angeles Chamber of Commerce and a director of the California Bank, Pacific Mutual Life Insurance Co., Pacific Coast Electrical Association, and Edison Electric Institute.**

**A native of Topeka, Kan., Mr. Quinton attended Topeka High School, Washburn Academy, and Northwestern University. Following three years in the United States Army during World War I, he served for six years with the Treasury Department in Washington, D. C., and for 16 years as a partner in the firm of Arthur Andersen & Co. before becoming associated with Southern California Edison.**

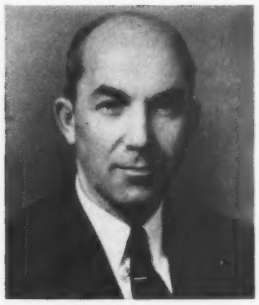
# New Members of the EEI Board of Directors

D. E. ACKERS
*President*, Kansas Power and Light Co.

WALTER C. BECKJORD
*President*, The Cincinnati Gas & Electric Co.

JOSEPH M. BELL, JR.
*President*, New York State Electric and Gas Corp.

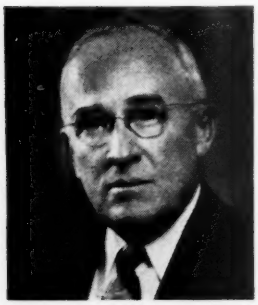
WALKER L. CISLER
*President*, The Detroit Edison Co.



B. L. ENGLAND
*President*, Atlantic City Electric Co.

J. G. HOLTZCLAW
*President*, Virginia Electric and Power Co.

R. K. LANE
*President*, Public Service Co. of Oklahoma

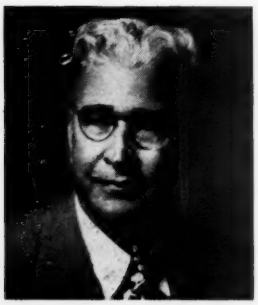


P. H. MCCANCE
*President*, Duquesne Light Co.

R. E. MOODY
*Exec. Vice Pres.*, Union Electric Co. of Missouri

HARRY B. MUNSELL
*President*, Kansas City Power and Light Co.

O. TITUS
*President*, Pennsylvania Electric Co.



W. O. TURNER
*President*, Louisiana Power and Light Co.

G. W. VANDERZEE
*President*, Wisconsin Electric Power Co.

WILLIAM WEBSTER
*Exec. Vice President*, New England Electric System

F. M. WILKES
*President*, Southwestern Gas and Electric Co.

R. E. Ritchie (second from right), President, Arkansas Power & Light Co., receives top prize in the Reddy Kilowatt Annual Report Award Contest from Ashton B. Collins, Director, Reddy Kilowatt Service, award donor. Left to right are Harry Restofski, Prize Awards Committee Chairman, and representatives of companies winning Honorable Mention Certificates, including M. H. Frank, Executive Vice President, Wisconsin Power and Light Co.; Charles E. Oakes, President, Pennsylvania Power & Light Co.; and (far right) J. J. Morrison, Assistant to the President, Gulf States Utilities Co.

ing a total loss of power for an extended period.

### New Resuscitation Film

One of the most unusual features of the general sessions was the Monday afternoon premier showing of a sound-color motion picture entitled "Pole Top Rescue." Based on the dramatic demonstration of the Oesterreich Method of Pole Top Resuscitation staged by a line crew of The Cleveland Electric Illuminating Co. at last year's convention, the film stars the same crewmen and depicts with startling impact how a routine job on an overhead residential distribution line can, through carelessness, result in a near fatality.

Filmed in a Cleveland suburb under actual work conditions, the picture opens with Foreman Gus Prugh assembling his men for a brief conference on safe work procedures. Crew members then begin their assigned duties, and tragedy strikes swiftly as a careless lineman contacts an overhead conductor. The resulting arc galvanizes the crew into action, and the following pole top rescue vividly illustrates the effectiveness of resuscitation techniques employed in the industry. The film's excellent color photography, its real-life setting, and its technical accuracy make for a stirring documentary on life-saving methods and the folly of carelessness.

In commenting on the picture, Mr. England observed that "the naturalness of the lineman-actors in their work, in the inevitable by-play that goes with it, and in their reaction to the accident, heightens the effect of the film and gives it definite human interest appeal. As a pertinent sidelight on a vital phase of electric operation, I am sure that many companies will find the film suitable for showing to all members of utility organizations and allied groups."

Produced for the Institute by Motion Picture Productions, Inc., the 29-minute, 16-mm film is available to member companies. Prints of the picture are priced at $350 each and may be obtained upon request to the Institute.

William A. Cripps (second from left), Pennsylvania Power & Light Co., displays the citation accompanying the Matthews Valor Award presented him by Claude L. Matthews (second from right), President, W. N. Mathews Corp., award donor, while Chairman Restofski and PP&L Operating Vice President H. Ferguson watch.

### Special Events

The Bendix Home Appliance Division of Avco Manufacturing Corp. was host to the ladies at a luncheon

held in the Carolina Room of the Chalfonte Hotel at noon on Tuesday, during which a fashion show featuring new synthetic fabrics in designs created by New York couturiers was presented. General Albert C. Wedemeyer, whose subject was "Responsibilities in Lieu of Right," was guest speaker. On the following day in Trimble Hall of the Claridge Hotel, the Institute was host to a ladies luncheon which heard Novelist Pearl Buck speak on "Korea Today." Also on hand was D. S. Kennedy, Chairman of the Convention Program Committee, who presented a concise and interesting report to the ladies on the business being transacted at the general sessions.

On Wednesday evening delegates and guests were invited to three buffet suppers held in the Dennis Hotel, Marlborough-Blenheim Hotel, and Claridge Hotel, at which the Institute was again host.

Later that night, at the Warner Theatre on the Boardwalk, Electric Energy, Inc., received the Charles A. Coffin Award, the industry's highest honor. The award was presented to J. W. McAfee, President of Electric Energy, Inc., by Ralph J. Cordiner, President of General Electric Co., in a ceremony described on page 234 of this issue.

Immediately following the award presentation, convention entertainment culminated in the appearance of Fred Waring and his Pennsylvanians, presented through the courtesy of General Electric Co. From a potpourri of musical selections that ranged from the "Nutcracker Suite" to the "Battle Hymn of the Republic" and from folk music to jazz, Mr. Waring and his talented group of singers, instrumentalists, and comedians wove a thoroughly enjoyable and relaxing program which paid tribute to Mr. Waring's consummate showmanship.

### Acknowledgments

In closing the convention on Thursday, Mr. England gave grateful acknowledgement to the many people and organizations whose cooperation contributed to the excellence of the Institute's twenty-first annual meeting.

"A great program makes a successful convention," Mr. England

*(Continued on page 296)*

# Remarks of Walter H. Sammis in Accepting Presidency of Edison Electric Institute

I thank you for the very great honor you have conferred upon me. It is going to be difficult to follow in the footsteps of my able predecessors. I shall give my best to this assignment and shall strive to further the aims of the Institute as set forth in its Constitution. I seek your cooperation.

Some members of the press have asked me since I have been in Atlantic City what my policy will be regarding various industry matters upon assuming the presidency of the Edison Electric Institute. I have told them that I cannot speak for the EEI membership without its direction.

Personally, however, I shall:

1. Endeavor to foster a greater spirit of community service and area development on the part of electric companies and their personnel, including the big task of making electricity do more for agriculture, to the end that the areas served may enjoy healthy and durable growth.
2. Endeavor to further the cooperative efforts between the electric industry and the Atomic Energy Commission in the development and utilization of atomic power for the general welfare of all people.
3. Endeavor to obtain from the Federal government, to the end that there shall be no unjust discrimination among electric customers, equal treatment for both the investor-owned companies and government-owned power agencies in opportunities for buying power from government dams and in the imposition of taxes; in other words, to obtain fair play.

All business should bear its share of the cost of government. I shall exert every effort to have the Federal government tax government enterprises competing with the private power industry on a basis equivalent to the electric companies. These companies paid $1,240,000,000 in taxes last year on their electric operations alone, or 23 cents of each dollar of electric revenue received, of which $775,000,000 or 14.5 cents went to the Federal government. Government power enterprises paid no Federal taxes and in most instances little or nothing in lieu of state or local taxes.

4. Endeavor to stop further expenditures by the Federal government for the building of power plants and transmission lines, which business-managed electric companies are willing to build.

The record of this industry in the seven and one-half years since V-J Day of having invested more money in generating and other electric facilities than the total for all the 63 previous years of its existence indicates how it has met the unprecedented needs for power and proves conclusively that private electric companies have the unquestioned ability to provide all the power that this country can use. And this has been done with due regard for the public's interest and under regulation by governmental agencies.

5. Endeavor, where feasible, to get the Federal government out of the power business as this becomes practicable. In the meantime, Federal agencies should be required to charge the full cost of electric service to their customers so that these operations will cease to be a burden on the Federal taxpayer.

Our Federal government has been using tax monies of its citizens to establish power facilities to compete in business with its citizens, whereas through the sale of such facilities it could help reduce the $273,000,000,000 national debt.

Governmental proprietary business is a threat to all private enterprise and without private enterprise there cannot long remain real individual freedom.

Only an enlightened public opinion can make these objectives possible of accomplishment. Therefore, I intend at every opportunity to make known to the American people the facts about our business.

# The President's Address

**B. L. England**
*President, Edison Electric Institute*

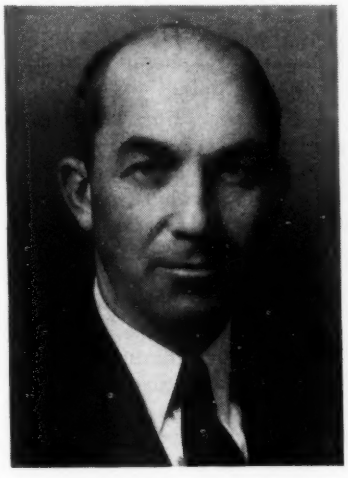
An address before the Twenty-First Annual Convention of the Edison Electric Institute, Atlantic City, N. J., June 1, 1953

TODAY the electric industry in the United States has great opportunities and along with these opportunities, much greater responsibilities. Much has been said about the way our industry has been undermined by the growth of socialistic policies and the 20 years of attacks by proponents of government power. But, I for one, believe that we grew strong, that we recognized our weaknesses and are facing the future with a greater depth of understanding because of these opposing forces. We know that the answer to "cheap government power" is cheaper, more reliable, less political, more businesslike, and more imaginative private power. Our companies have never been financially stronger, service-wise more capable, and earnings-wise more attractive than they are today.

The question is sometimes asked, "Why do we have conventions and whom should we send to them?" We attend conventions because we have a community of interest and because we do a better job in serving our stockholders, our customers, and our nation when we keep in touch with what is going on in all parts of the country. The convention helps us to establish and renew acquaintanceships valuable in the conduct of our company business. It gives opportunity to voice significant views. It helps us to keep our perspective, to clarify our thinking, to develop informed opinions, and to grasp the real significance of new developments.

Electric companies have much business with neighboring utilities and with electrical manufacturers. Friendship and mutual understanding and a disposition to consider the concerns and opinions of one another are important in the discharge of our full responsibilities to our customers. The convention helps to develop these relationships within the industry.

The convention affords opportunity for the younger potential leaders to



B. L. ENGLAND

make contact with the top leaders in the industry and to acquaint themselves with the broader aspects of the electric utility business. It lifts their points of view and enlarges their vision of their own jobs. It also offers an opportunity to stimulate division managers in their very important job of serving the customer. To most of the customers of investor-owned utilities, they are the company, yet the nature of their work tends to isolate them from other industry leaders and to cause them to lose contact with what is going on generally in the industry.

It is important that top executives attend for the influence they can exert on the future careers of those who will be the top leaders ten, 15, and 20 years from now. They owe this to those who will come after them. It is desirable that the key men of each company and the younger potential leaders and division managers attend conventions occasionally for the stimulation and development to be obtained. That is why we have conventions. These are the people who should attend.

The sales of electricity have been running well ahead of last year. The Federal Reserve Board Industrial Index stands at a high level. Nevertheless, the latest reports of our Power Survey Committee obtained from the power areas and from manufacturers make it clear that there will be an adequate supply of power throughout the coming year in all parts of the country, except, possibly, in the Pacific Northwest, should there again be an adverse hydro season such as occurred last fall.

The electrical manufacturers advised that they will deliver this year 12,500,000 kw of generating equipment. This amount is greater than the total generating capacity of all electric company plants in 1920. Of course, not all of these 12,500,000 kw will be installed during the year. The present estimate is that about 10,000,000 kw will be put in operation.

Our survey shows that the entire electric utility industry will add about 30,000,000 kw in the three years 1953 to 1955, inclusive. Not only will we have ample capacity to supply the power demand in the years ahead of us, but plainly we will have a big selling job to do if we are to make the most of the commercial opportunities that confront us.

It was found advisable during the year to study the need for greater coordination between manufacturers and the industry. This was particularly true in the planning of sales promotion programs and advertising. It is gratifying to report that a Coordinating Committee has been established, made up of four members each from NEMA and EEI, with the later addition of National Association of Electrical Contractors, National Association of Electric Dealers, and National Association of Electric Wholesalers. This committee has now set up objectives, and we can look forward to a greater unity of effort in the period ahead when sales will be very necessary.

Attention is being given again by the Federal government to the matter

of labor legislation. Prior to the enactment of the Taft-Hartley Law, the Board of Directors of the Institute approved a statement of policy prepared by one of its committees setting forth the position of the Institute with respect to the labor issues which led to the enactment of that law. The statement set forth at that time will be found to be sound and applicable today. I recommend that from time to time we read the statement to refresh our views on labor questions. By way of example, I quote two items from the statement:

> No specific Federal legislation singling out the electric industry or the public utility industries appears necessary to minimize the possibility of interruptions of utility service due to strikes.
>
> Electric utilities are essentially local enterprises subject primarily to state regulation as to rates, finances, and standards of service. When necessary, any special laws regulating the labor relations of utility employees and managements should, to the greatest degree possible, be state laws providing for regulation and enforcement by state agencies.

For years the Federal and state governments and many national and local agencies have been concerning themselves with the development and preservation of our natural resources. In response to a request from the President's Water Resources Policy Commission, the Edison Electric Institute prepared and three years ago at its Convention adopted a brief statement of principles and policies with respect to the development of water resources in the United States. The statement dealt with fundamentals, and it is as sound today as when it was written. Let me call attention to a few of the 15 principles we adopted.

- The government should encourage development of private capital.
- Much of the river development can be accomplished by nonFederal capital.
- Licensing under the Federal Power Act should be encouraged.
- Local agencies, not the Federal government, should be responsible for the adequacy of power supply for nonFederal needs.
- All projects should be economically justifiable.
- Benefits should be required to exceed costs by substantial margins. (The wisdom of this principle has been demonstrated by many recent instances of gross underestimation of costs by the Federal agencies.)
- Power should be sold at market value.
- Disposition of power should be by nonFederal marketing.
- Federal power should be sold without discrimination.

I think it can fairly be said that there is a growing realization throughout this country, particularly in the West, that local planning and local responsibility must have a dominating role in the sound development of natural resources and that there is grave danger to the survival of local government if Federal bureaus assume the determining role in the development of natural resources. If legislation were enacted in conformity with the recommendations of the 1950 Report of the President's Water Resources Policy Commission, it could only eventuate in national control over all water and land. There could be no real freedom in this country with the Federal government in full control of water and land.

Let us contrast for a moment the long-range effect of big government control of natural resources on local government and individual freedom with the long-range results when power companies develop water resources. The development by the companies is subject to local and national regulation. They must make their plans and their operations conform to the mandates and wishes of local authorities, as well as meet the requirements of national agencies. Their work must conserve and develop natural resources in conformity with the public interest, both local and national. They are not and cannot be a law unto themselves. Even if they were disposed to conserve and develop natural resources unwisely, they could not abuse their power because they do not have it to abuse. They are subject to control under the laws and regulations of the local and the Federal government. The Federal agencies are not under such regulation.

I believe that any fair-minded person who will inform himself of all the facts must agree with the conclusion that the Federal government in its legislation, its regulations, its interpretations of laws and regulations and its administration of them, and in its judicial proceedings has heavily discriminated against investor-owned power companies and has fostered the nationalization of electric power. I need not argue the point. Many eminent persons in the past year, including President Eisenhower and former President Herbert Hoover, have stated the case.

The defenders of such legislative and administrative action contend that these actions have been necessary to preserve our natural resources for the people and to protect them from the greed of big corporations. Their contentions are not valid. They deliberately ignore the fact that investor-owned companies are under local regulation and control, and benefits or advantages to be had from the building of power dams or from participation in government built power projects must of necessity go to their customers. And further, in making such developments the companies must conform to local sentiment in conserving and using natural resources. Generally, they must also obtain a license from the Federal Power Commission and make their work conform to the overall plans of various Federal agencies with respect to conservation and utilization. What organization can better conserve our natural resources than power companies which have to conform their plans to local regulation and must satisfy conditions determined by the Federal government?

On the other hand, no state and local agencies establish and enforce the conditions under which Federal bureaus will carry out their construction plans and operate their power facilities. They follow their own considerations. When it comes to the exercise of monopoly there is nothing to compare with the monopolistic powers that Federal agencies arrogate to themselves.

In competing with private business, there are several weapons which the Federal government uses. Two of these are important: (1) tax discrimination and (2) selling power below cost to preference customers. Investor-owned power companies,

and therefore their customers, are heavily taxed to support the government. At the present time they are paying 14 per cent of gross revenues to support the Federal government and 9 per cent to support local governments, a total of 23 cents out of every dollar they take in. It is proper that along with the rest of American business they should pay taxes, but it is grossly unfair for electric company customers to be taxed through their power bills to support the government and then for the government to exempt by law from taxation those customers who obtain their power from local and national governmental proprietary business. At present tax rates the cumulative effect of this tax exemption is enormous.

No industry, however efficient and progressive in its engineering and management, can indefinitely survive such tax inequity. Either the inequity must be corrected or, in time, free enterprise in the power field will be destroyed.

Furthermore, the proprietary power business of most governmental agencies has the unfair advantage that interest on the bonds sold by them to provide money for this business is also tax exempt, a fact that materially reduces the interest rate on such bonds.

The practice followed by Federal agencies of selling power below its real cost and thereby forcing Federal taxpayers to subsidize part of the power bills of the consumers of the underpriced electricity is widespread and has been recognized from its beginning. If power were sold to cover the true cost to the Treasury, including an amount equivalent to the Federal taxes that would be paid if the property were investor-owned, in most instances the cost of Federal power would equal or exceed the fair market value of power as established by the production cost from other power sources in an area. Hence, there would be no preference in the preference clause, but by ignoring and understating costs, the power is sold at prices that carry a heavy subsidy from the Federal taxpayer.

In the case of TVA, no interest is paid on monies received through appropriations. Independent estimates made years ago came up with the answer that the TVA yardstick was 18 or less inches long when it was set up. Since the establishment of the Tennessee Valley and the Pacific Northwest projects, the cost of construction has doubled, yet in neither area have rates been significantly increased to the preference customers.

The laws governing the sale of power from Federal projects set up certain preference customers, that is, local governmental bodies and cooperatives. These are agencies that have not been taxed to help pay for the facilities built by the Federal government, yet they are given preference in buying power that is priced to make this preference attractive to them. The practice is obviously designed to lure municipalities and rural districts into setting up power systems of their own to qualify as preference customers under the provisions of Federal law.

As stated before, the proponents of these discriminatory practices argue that public resources should be developed for the benefit of the public and not for private profit, but in all fairness, who but the public benefits if power is sold to regulated investor-owned companies. Any savings in cost to the company due to purchases of low-cost power go to the customers a company serves. Their tax money has helped build the projects. Surely there is no fairness in a provision that denies to certain classes of American citizens a government subsidy extended to another class. This is what we mean by unfair competition, and legislative changes are needed to correct the lack of fairness. It is too much to ask Federal bureaus at all times to restrain themselves. They have been tried in this regard and found wanting. Congress should act to reestablish fairness in the provisions of its laws.

The issue here is much broader than the power industry. The Federal government has entered into other fields of business. The power industry is vitally interrelated with practically every other industry. A threat to nationalize and destroy any American business or industry is a threat to destroy the free enterprise in all American business and industry. That inter-relation has been well demonstrated in a number of foreign countries, and America can profit from the lesson they afford. The free-enterprise system is efficient, vigorous, and resourceful. It can and does put up a good battle against odds, but certainly the power to tax is the power to destroy. Big government is bigger than any industry, and if the basic inequities I have pointed out are not corrected, the government will wind up by nationalizing many of our basic industries, as was done in England, and through them will effectively dominate practically all business and industry.

While we are asking for fair competition, let us be sure that we give fair competition in return and that we go even beyond the actual requirements of regulation and law to assure this in our business dealings with neighboring municipal and co-op systems. They are not charity subjects and can and should pay their way like any other proprietary business, but we can be helpful to them, and they can be helpful to us. They are our neighbors, and let us see to it that we are sound and fair in all our dealings with them. It will become apparent to them that in reality we are their best friends.

In speaking of the efficiency and resourcefulness of the free-enterprise system, I call to your attention the very heartening reversal of the trend from governmental power business in the Northwest toward a strengthening of investor-owned power business in that region where the Federal government has been pouring out many hundreds of millions of dollars for power facilities. Another very heartening development has been the bold enterprise of five companies in organizing Electric Energy, Inc., to challenge successfully the monopoly of the Tennessee Valley Authority, with its tax-free, interest-free business, in preempting the supply of power requirements for the Atomic Energy Commission. This venture was followed shortly thereafter by the organization of the Ohio Valley Electric Corp. backed by 15 power companies to go ahead with a $400,000,000 power-generation project. Another similar development is the program of five power companies in New York State designed to carry out the redevelopment of power at Niagara Falls, the site where the privately-owned Niagara Falls Power Co. wrote an illustrious page in the history of private enterprise.

This point brings me to the part which power companies are playing and can play in the development of the areas which they serve.

A utility company in the conduct of its business must engage efficiently in long-range planning and have the courage to make decisions far in advance of operating necessities. It must be prepared to serve the power needs of the territory. It can grow no faster nor prosper more than the territory it serves. It cannot shift its place of business. On the other hand, it can be a most constructive force in the development of the area that it serves, helping to build up the well-being of its territory and thus helping its own business to grow.

There is no magic in the power company's contribution to area development. It has no money to squander on popular ventures. It must pay interest and dividends to those who furnish its funds, and its rate of return on its investment must be kept moderate. The public service commission will see to that. But to carry out its functions in serving agriculture, commerce, and general industry, it must have trained personnel who are continuously engaged in planning and men who are thoroughly acquainted with the territory and its possibilities and know how to put electricity to work to earn more for the customer.

The power company is, therefore, especially qualified to contribute to area development work and has an unusual opportunity for civic leadership. Do not think that such work is unappreciated even though such appreciation may not be recognized for a long time nor expressed. I will take the liberty of quoting from a few lines of an editorial in the *Cleveland News* of March 27, 1953, commenting on the contribution of The Cleveland Electric Illuminating Co. and its President, Elmer Lindseth, a past President of the Institute, toward the well-being of that area.

> This program (urban redevelopment) comes to us from an earnest, hard working industrialist who knows what he is talking about, who hasn't spent as much time talking as in working to get Cleveland its rightful share of commerce and industry.

In recent months, there has been a substantial increase in interest rates on long-term debt. Because the electric industry is pre-eminent among industries in the amount of capital it requires and the slow rate of turnover capital, the interest rate on bonds is very important in its rate making and financial problems, and this change is a matter of concern to all of us. Rate increases obtained during the past few years to offset the rise in the cost of labor and materials were based on the cost of money then prevailing. It becomes critically important that public service commissions give adequate consideration to changes in the cost of money if we are to carry forward successfully our large construction program. This is not a matter that company management or regulatory commissions can afford to treat lightly.

In the long run, however, it is important to all free enterprise, and particularly to the electric power business, that thrifty and industrious people be given incentives to save and invest their savings with confidence in the future buying power of the dollar. This change in interest rates is in the direction of sound and fair treatment of the investor, and we should clearly understand the significance of this point.

Our engineers who have been battling during the past 20 years to offset the increased costs of labor and materials by improvements in designs, construction, and operating methods may find that they have a new economic balance to strike in their planning and designing because of this change in the cost of money.

The investor-owned companies spent about $2,600,000,000 in 1952, and at present construction rates it would appear that they will spend about $3,000,000,000 in 1953, of which about two-thirds will have to come from the sale of securities or loans. These are large figures, and they are quoted to emphasize the significance of any change in the cost of money.

Next year on October 21 we shall celebrate the 75th Anniversary of Thomas A. Edison's successful invention of the incandescent lamp. This event, as we now see from our present position, was a very significant turning point in the life of America and, to a lesser extent, in the life of people generally throughout the world.

The Board of Directors of the Institute has established a Sponsoring Committee, a Planning Committee, and a Program Committee, which have presented a plan for celebrating Light's Diamond Jubilee to the Board. An important feature of this plan will deal with community celebrations to be fostered by electric companies. The Institute would be called upon to assist in the preparation of Jubilee materials, which the Program Committee, made up of representatives from a number of companies, has concluded will be useful in the furtherance of such community recognition of this great event.

The incandescent lamp began the mass use of electricity. Free enterprise fostered the growth of that use to unmatched degree. Our present standard of living has developed largely from that growth, and continuing growth and new horizons promise a new era of electrical living. Light's Diamond Jubilee affords us an opportunity to refresh the minds of the older generation and bring to the minds of the younger generation this historic event and what its significance has proven to be and what it offers for the future.

Information concerning the plans and indicating the part that electric companies, in conjunction with companies and organizations in other branches of the electrical industry, can appropriately undertake will be made available shortly.

No industry in the world shares information so freely as the electric industry, and no organization that I know of does such a thorough job of bringing the latest experiences and the latest developments in every part of the industry to the attention of all its members as does the Edison Electric Institute through its committees. This sound practice faithfully followed for nearly 70 years is one of the reasons for the sturdy growth and unhalting advance which the power industry has made throughout its history, an advance that has seen no let up in the rate of growth and in the striving for improvement in every phase of the business.

One of the rewards of serving as President of this Institute is to be-

(*Continued on page* 233)

# A New Look at Utility Regulation

**Eugene S. Loughlin**

*President, National Association of Railroad and Utilities Commissioners, and Chairman, Connecticut Public Utilities Commission*

An address before the Twenty-First Annual Convention of the Edison Electric Institute, Atlantic City, N. J., June 1, 1953

THERE is probably no more striking demonstration of the success of the American system of government than the solution of the social and economic problems of our public utilities through the invention of the machinery of regulation. There is probably no more conclusive demonstration that an enlightened free people can cope with any threat to their most cherished institutions.

The breadth, scope, and history of the regulatory movement are so great that to deal successfully and clearly with it demands that I confine myself to only the most salient aspects.

I have long turned over in my mind the thoughts which follow, and ever since being honored by the National Association of Railroad and Utilities Commissioners with the duties of its principal executive office, I have dedicated myself to making these thoughts known to the public and to responsible men in the industry, in government, and in the investment field. My purpose is a clear and simple one. It is to dramatize the overwhelming influence which utility regulation—as an instrument of government and as a force of economics—has in our society and the crying need to improve and strengthen this unique institution.

### Increased Awareness

My remarks will highlight some of its most striking characteristics, always with the purpose that through an increased awareness we can improve upon the system. It is my personal conviction that a new and fresh look at the regulatory process is long overdue. Furthermore, it is in the best interest of all parties—the public, the industry, and the investor.

This thing called regulation by organized independent regulatory agencies was the result of the reactions of independent people to the excesses of capitalistic liberalism developing out of the fundamental change in political and economic philosophy following the Middle Ages. From the original reaction to economic oppression, the institution of regulation has matured and its powers have gone far beyond the "thou shall not" stage. Regulation today has positive powers of initiation as well and can be considered indigenous to the English-speaking world. During the course of the development of our economic society, various industries and occupations, complex in character and with manifold internal problems, have from time to time come to assume such significance in our national life that a measure of social control of them has become essential. This form of social control was devised in a manner fundamentally consistent with the slow and intricate evolution of the American economic system and with the processes of democratic government. One of these industries is the public utility industry. The control devised is the independent regulatory commission which has built up a whole body of administrative law.

EUGENE S. LOUGHLIN

The regulatory agency came into being not as a single comprehensive, philosophical concept, complete in detail, but by a process of empirical growth.

The regulatory process in this country traces its beginnings from the early experience our people had with what was at that time a business bearing the typical economic characteristics of the utility as we know them today. That business, of course, was the railroad. Students of the movement have followed the development back to my own state. As early as 1832, Connecticut had granted a special railroad charter and created a special commission to ensure compliance with its terms. In 1849, Connecticut set up a permanent commission for that purpose, the first permanent railroad commission to be established. Although fundamentally unlike and weaker than the 1869 Massachusetts commission, it was nevertheless charged with the duty of supervision and was directed to report its investigations to the legislature and to make recommendations concerning compliance with charter provisions and on safety matters.

### A Gradual Process

Of course, the present-day commission with its comprehensive powers and responsibilities begins with enactment of statutes in Wisconsin and New York in 1907. The change in emphasis from the almost vindictive and punitive Granger States railroad commissions of the 1870's to the modern commission, conscious of its complementary and pervasive responsibilities of ensuring sound and efficient utility service at reasonable rates, was a more gradual and less clearly marked process.

But the tedium of history has a place only of background in this presentation. Like all background, however, we would lose perspective unless it were in the picture. It does much to explain the present situation of regulation, and its growth exemplifies the close identity this social phenomenon has with all our American institutions.

The importance, then, of sound regulation to the public generally, to the industries it regulates, and to the investors, small and institutional, is simply that it has succeeded in preserving for America a free and privately-owned utility and transportation system. It is not without significance that only in America, where regulation has developed to the highest refinement, of all the countries in the world, is the rail transportation system still in private hands. My personal belief is that the governmental reform which will have the most beneficial effect on the regulated utility industry is an overall improvement in the caliber of the regulation under which it operates. More valuable than income tax legislation, more important than labor laws, more far-reaching even than changes in national power policies, would be the development of better regulation of utilities, properly divided between Federal and state responsibilities, to the point of strengthening public and investor confidence. For, without sound regulation there can be no really healthy regulated company, and without good corporate health, investors will be discouraged and the service to the public will suffer.

### Century of Change

I have touched on the fact of the growth of the regulatory process. Now, what has been the result of this century of change? Has it been progress? Yes, in an abundant measure; the technique and tools of performing what started as an experiment and stayed to be an institution have been perfected.

But has that progress kept pace with the jet-like speed with which one revolutionary development crowded the heels of another as this nation came out of the dimness of the sputtering oil lamp into the dazzle of the fluorescent tube? In many cases the answer is no.

At the outset of an evaluation, we are met by two of the most basic elements in any regulatory equation—the organic legislation plus the persons who administer it. The basic acts under which the several commissions operate range in scope from relatively ineffective powers to strong and sweeping delegations, in some cases approaching the limits of management of the property itself.

It is true that there is something basically appealing to management about the thought of operating freely with little or no restraint imposed on the utility by statute. Afer all, who would be the first to complain of imprudent management if it were not the owners? It needs little thought, however, to detect the fallacy in this position. The characteristics of the utility business—the profound public responsibilities of the utility company, the relative absence of competitive controls, the tremendous size and investment involved, the widespread ownership and the concentration of economic power—prompt such statements as former President Hoover made to an audience recently when he said, "Free men can no more permit private economic power without checks and balances than governmental power without checks and balances."

When we turn to the personnel who administer the laws, some of the more difficult problems begin to emerge.

Not the least of these is the traditional hostility which society has had toward bureaus and agencies as opposed to, for example, the courts. The danger is, as Thurman Arnold has said, "that a few bureaus are necessary perhaps in a complicated civilization, but if the bureaus increase in number and power, we suddenly find that without knowing it we have created a 'bureaucracy,' which is one of the worst fates that can befall a free people. The distinction between bureaus and courts is important. Courts are bound by precedent, and bureaus are bound by red tape."

As part of the administrative law structure, however, a utility commission is suspect of harboring within it many of the seeds of this bureaucratic abuse. There are even many who disagree on the proper organization and function of a utility commission. Should it be passive, independent and judicial, acting only when matters are brought before it? Should the commission act merely to make findings of fact and recommendations, or should it affirmatively and aggressively play an exclusive role as the protector of the public against the alleged monopolistic oppression of the utility?

Each of these positions has much to recommend it. The best answer seems to be that the customer is entitled to aggressive protection of his interest, while the utility and its investors are entitled to an equally responsible and impartial tribunal. As we shall see, however, truly sound regulation sees no dilemma in this predicament. Properly administered, organized, and staffed, there is no danger of bureaucracy in a regulatory agency.

Some fears are well-grounded, however, for the discretion entrusted necessarily to the regulatory agency is wide indeed. Like the idea of censorship, regulation to a large extent is as good and as valid as the men who administer it. Its big weakness is that it depends for its vitality and validity on the person of the regulator and on his integrity. Recognizing this, commissions have been traditionally plural, providing for the benefit of group thinking and discussion as is found on our appellate benches.

The duties and functions of today's commissions are only too well-known. Because their decisions affect all concerned so vitally, only a well-informed commission adequately staffed and compensated should make the key decisions. These men need not all be experts in the techniques employed, that is, in all the refinements of the industry, but they should be men of sound judgment. There is nothing more potentially harmful to the regulatory process than regulators so steeped in detail that they cannot see around their subject. Overspecialization in the person making the final judgment is dangerous in any field. There can be no doubt that highly skilled men, trained in the mass of detail which busies the commission, should be available at every stage in the process of rendering decisions. But, it is one thing to urge the need for expert consultation at every stage in making policy; it is another thing and a very different thing to insist that the experts' judgment must be final. The expert sacrifices the insight of common sense to the intensity of experience. "Experts," said one observer, "must always be on tap but never on top."

But the problem is to obtain and hold the type of varied personnel—experts on the staff and advisory level, men of sound judgment and unquestioned integrity on the commission level.

It is frequently observed that it

takes from four to six years of regulatory experience before a commissioner or a member of the staff is fully conversant with the problems in the utility industry. Yet during this period and after the individual has obtained a degree of skill and experience, the compensation paid to these men is dangerously inadequate. How can the commissions provide the public and the utility industry with the caliber of regulation contemplated by law unless commissions can be assured of the continuity of personnel and policy which comes from experience? How can commissions expect to attract and retain experienced personnel unless they are fairly compensated?

### Wide Range of Problems

As is true in most human situations, individual companies are deeply involved with the problems of their own businesses. Public utility commissions, on the other hand, must be familiar not only with the many problems of the electric industry, but are necessarily interested in and concerned with all the problems of all the utilities subject to their respective jurisdictions. The business of regulation makes it necessary for the commission and its staff to be familiar with railroads, motor common carriers, gas companies, pipe line companies, water companies, telephone and telegraph companies, buses, taxicabs, and warehouses in addition to electric public utilities. It is humanly impossible for anyone to be fully conversant with the functioning, financial aspects, and the many varied problems which arise in each of these categories without a great deal of training and experience in the field of regulation.

Development of atomic piles has progressed beyond the laboratory and discussion stage and now presents a current problem for the electric industry. It represents but one of the newest technical questions with which regulatory agencies must deal and illustrates the breadth of the experience required to administer the regulatory process properly.

Ever since the United States Supreme Court was persuaded to accept the theory that the Fifth and Fourteenth Amendments protect utility property from confiscation resulting from unreasonably low rates, regulation has operated between this floor on the one hand and the ceiling of unreasonably high rates on the other. Broad as these markers have left the path, the final responsibility of marking the proper line where reasonableness lies in a particular case rests with the utility commission.

But this duty of determining the revenues which are sufficient for the company is influenced by many other considerations which are the responsibility of the commission. The fixing of rates would be largely emasculated without the correlative responsibility and jurisdiction over the adequacy of service, safety standards, security issues, accounting practices, and principles.

The decisions of commissions then accumulate over a relatively short period into a body of influence and policy which can and do affect companies subject to their jurisdiction and, in turn, their customers and investors. For example, the decision in any particular rate matter is compounded of subsidiary decisions respecting the cost of capital, historical, present and prospective, the debt ratio, value of service, reasonableness of operating expenses, and design of the rate structure itself, to name a few.

From this brief catalog of considerations which weigh a commission decision, it should be obvious that for selfish reasons alone, the public, the utility companies, and the investors should make every effort within their power to assure themselves that their respective interests are ably and effectively weighed and judged at the commission level. The nature and modern concept of the function of a commission, however, discloses that these interests when extended far enough merge into one common theme. That theme is the preservation and encouragement of a properly financed and healthy utility structure, ably designed to take advantage of technological developments in the industry and pricing their services at rates which will promote the greatest volume at the lowest unit cost consistent with sound economic principles. This is the end result at which the public, the company, investor and commission together should aim. Under a sound commission, ably staffed and administered, such an end result can be achieved. Good regulation contributes much to the welfare of the people and the prosperity of the state.

For a reason far less personal and selfish than the prosperity of the individual company, utilities generally should welcome, encourage and support strong, firm, and just regulation. For the reasons already mentioned there is no doubt in my mind that the firmest bulwark between state ownership and the continuation of a private-shareholder ownership of the utility industry lies in the hands of the regulatory bodies. For this reason, if for no other, the public and the utility industry have a tremendous stake in the health and continuation of good utility regulation.

When the public, the companies, and their investors realize the stake each has in good regulation, much of this problem will be on the way to solution. It is to everyone's advantage that service standards be as high as possible and rates as low as possible. The commission which misconceives its position and presumes that its principal purpose is to oppose the industry can do no one any good. If it becomes so persuaded of the infallibility of management or is so inadequately staffed that it is unable to question effectively the policies of the companies, the injury to the public and the investor, although indirect, is no less serious.

### Sweeping Results of Judgments

The commission must have intelligence enough to judge surely and confidently. It must have independence enough to judge fearlessly. As is well-known to utility lawyers, public utility regulatory agencies, in their opinions, are deciding questions of law which within very broad limitations are final judgments. They are making law just as surely as are the courts. They are also making findings of fact with sweeping consequences which are virtually incontestable except on the basis that they were arbitrary or clearly contrary to any evidence on record. It may amaze you as it did me, when I became aware of the fact that in terms of dollars and in terms of people affected, commission decisions are concerned with matters of far greater magnitude than almost any of our high state court proceedings. Moreover, the concern which the court has in a given proceeding ends when judgment is rendered in practically all cases. It is an *ad hoc* decision and

being *res judicata* is a closed matter when upheld on appeal.

The utility commission, however, has a continuous responsibility in every matter before it. Regulation is a continuing process and a commission's concern only begins with the issuance of a decision. It must continue to live with the consequences of every decision long after it is rendered. Its responsibilities, therefore, are far greater than those of many courts in most proceedings. So long as commissions guard their status as independent quasi-judicial agencies, however, this responsibility can be ably discharged.

In some instances their judgments have not been entirely free of pressure. This is a shameful mockery of the concept of the quasi-judicial regulatory agency and should be eliminated as promptly as education can do the job. The Honorable John Lodge, the Governor of the State of Connecticut, has stated:

> As Governor, I have never interfered, nor would I ever seek to interfere with the Public Utilities Commission of our State in its judicial functioning. So far as its judicial sphere is concerned, a public utilities commission is, in my opinion, entitled to the same scrupulously safeguarded freedom of action as we accord to the courts to which the commission's decision may be appealed.

This is the dignity to which all states and all commissions should aspire. This is the ideal to which all of the public, all companies and all investors should combine their efforts to aid commission regulation in achieving. When that purpose is accomplished, men can say confidently that regulation is an example of one social institution which has progressed as rapidly as has scientific progress in the field with which it is concerned. The outstanding paradox of our civilization is that men have provided us with the machines of a giant while our social maturity is yet adolescent. We have mismanaged and almost bungled this splendid equipment. The utility industry has a unique opportunity to recognize this paradox and to accept its challenge as part of its responsibility to work for sound, able regulation.

Let us briefly review some of the ways in which regulation can affect the ratepayer, the company and its investors. This will disclose final and conclusive proof that it is in the interest of the regulated to insist on good regulation as much as it is to insist on good management.

Consider the cost of capital. If anything typifies today's utility industry it is the steel skeleton of a new generating station rising against the sky or the long slash of a natural gas pipe line trench stretching away to the horizon. Billions of dollars have been invested since the war in new equipment and plant facilities and billions more will be invested before this trend slackens. Because a utility cannot and should not be permitted to expand its plant from surplus earnings supplied by ratepayers who will be required to pay a return on plant they built themselves, this money must be supplied by investors —large and small, institutional and individual. The eagerness with which they avail themselves of investment opportunities measures in large part the price the company seeking the money must pay for it, and the importance the cost of money has in the ultimate rate which consumers must pay for service.

Now, investment counselors and investors are a cautious lot—particularly in the utility field. A great many factors influence their decision to buy at a given price and hence determine the cost of capital to the company. Aside from governmental fiscal policy, however, confidence in the company is probably the greatest single factor. A commission with a just reputation for enforcing conservative, fair and sound rate policies, capitalization ratios, financial reporting, and accounting procedures, to name some, is of first importance to such a determination. The investor knows where he stands. The company reports are fair and accurate and the investor can draw a reasonable conclusion as to the future.

More and more the traditional investor's attitude that his interest stops at the last line of the income statement is being changed. True, there are many factors between the utility operating income and the net after income deductions, such as capitalization and management policy. In jurisdictions where security issues must be approved by commissions, investors have greater confidence in the capital structure of the company. With the increase in the investor's confidence in the protection of his investment, his willingness to invest grows. The result is a reduced cost of money to the company which benefits the consumer and the investor alike. The impairment of the financial health of a utility only serves to increase the cost of service to its customers in the final analysis.

The chief remaining influence not affected by regulatory powers is management itself. But our traditional American concept prohibits this area from trespass. Here lies the sphere for free enterprise to demonstrate itself in the utility business.

Now to consider the problem of the consumer. If he has had demonstrated to him by a history of good efficient service on the part of the utility that his company is a good company, his price consciousness is not nearly as acute. Experience demonstrates that a ratepayer's concern over a price rise is much more sensitive where service is poor; that his concern with service outlasts his concern over the higher rates. It is the vagaries of uncertain voltage—a flickering television set, a burnt out motor, an outage at mid-day idling hundreds of workers and costing thousands of dollars in lost time—these are the real concerns of the customer.

But insurance against such uncertainties is possible, provided there is a good plant. Good regulation permits and encourages such facilities by cooperation between the company and the commission in anticipating its needs, by making only realistic claims before the commission of the need for additional funds, and by the commission recognizing this need for expansion and accommodating its thinking to it.

In such a climate, service will be adequate and reliable, rates reasonable, and confidence in the commission and the companies complete.

Let us consider the problem of rates a little more specifically before ending. A sound commission will follow a policy encouraging the company to utilize all available data to determine as accurately as possible the expense and plant responsibility of each class of customer and to price its product accordingly with competitive and other economic limitations in mind. The commission which is

adequately staffed and equipped will weigh these judgments and fix rates based not on expediency or instinct. Thus, the forces of supply and demand will be brought to bear in improving the load factors and encouraging the greatest volume of use of the company's product to the advantage of the company and customer alike.

But only in a fearless and informed regulatory climate are such decisions possible.

If this industry wants to assure its continued prosperity and expansion and to enjoy the confidence of its customers and the public generally, it can do nothing better than to lend its great weight to the end of achieving a uniformly improved utility regulatory climate throughout the 48 states and the territories and insular possessions. It will not be done in a day. But each day spent doing it will be 24 hours closer to the ideal and an immeasurable distance farther from the end none of us wants—state socialism.

Commissions are called upon in each jurisdiction to regulate billions of dollars of investment and to control expenditure of ratepayers' dollars which are small in individual cases but amount to millions in totals. These huge investments and great expenditures are entitled to the protection consistent with the great part they play in our economy. Only a commission which is adequately staffed can discharge this responsibility objectively and efficiently without undue delay.

Every fair and ethical effort should be brought to bear on the appropriate governmental authorities to see that this type of regulation is provided.

The companies will be on far firmer ground in their protests against the incursions of the Federal government into the field of state regulation if they can point to a vigorous and able state commission, organized and equipped to discharge the obligations implicit in public regulation. States' rights are best discharged by recognition of states' duties.

I am confident these objectives of good regulation are consistent with the highest ideals of the public interest and that a cooperative effort to support good organic legislation, informed, dispassionate and mature interpretation, adequately staffed and compensated commissions, and a mutually cooperative attitude by companies, commissions, and ratepayers will do much to cement a strong utility structure and thus a strong economy.

The true protection of our free, private enterprise system, in which the public utility industry is basic, is a soundly conceived and independently conducted system of public regulation in the public interest. The alternative, insofar as the utility business is concerned, is and always will be state ownership and control. It is in this particular respect that those who are regulating and those who are regulated are united in unalterable opposition.

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# The President's Address

(*Continued from page* 228)

come better acquainted with the men who lead and those who constitute our committees. I now have an appreciation I never had before of the role they perform in studying every aspect of our operations and in fostering the development of sound practices throughout. We must not lose sight of the fact that our industry enters importantly into the life and labors of practically everyone in the United States. It serves about 98 per cent of the occupied homes and an equally high percentage of the fixed locations where work is performed. Electricity's part in serving these activities continues to grow and multiply, and the watchful attention of our committees keeps our industry from falling behind in any of its accumulating responsibilities to the public. We owe our thanks to the chairmen and members of these committees and to the companies who support the chairmen in carrying out their responsible work.

These are great days in the history of electric power. Our role as individuals has been cast in this eventful period of time. I believe that we are alert and are measuring up to our opportunities and our responsibilities, but this is no time for self-congratulation. We have great work to do, great decisions to make, important policies to establish, much commercial development work to accomplish, awe-inspiring engineering opportunities ahead, heavy responsibilities and important decisions in the matter of finance, questions that tax our capabilities in relations with the local and Federal governments and with the public generally.

If we do this work well, if we are wise and unflagging in our labors (and there is no excellence without labor), we will promote the interests of our investors and employees and we will advance the interests of America and of free enterprise, and without free enterprise there can be no individual freedom. We cannot afford even to contemplate the evil to our companies and our country that would ensue should we slacken in our efforts, should we rest on our oars, should we allow our judgment to be obscured and our course to be misdirected during this great period in the history of our industry.

I see a growing awareness that we are one segment of the economy, functioning as one member of the team. In the days to come we shall reread again and again from the London speech of the General, now President Eisenhower.

"The winning of freedom is not to be compared to the winning of a game. . . Freedom has its life in the hearts, the actions, the spirit of men. It must be daily earned and refreshed —else like a flower cut from its life-giving roots, it will wither and die.

"We fight not only our own battle —we are defending for all mankind those things that allow personal dignity . . . those things that each believe are important in the eyes of God. We are preserving opportunity for men to lift up their hearts and minds to the highest place—there must be no stragglers in such a conflict.

"The road ahead may be long—it is certain to be marked by critical and difficult passages. But if we march together, endure together, share together, we shall succeed. . . ."

By our example today of better performance under free enterprise there will be an assurance of a free society tomorrow.

# Electric Energy, Inc., Wins Charles A. Coffin Award

FOR its "brilliant and bold conception" in pioneering a coalition of electric companies to supply a record amount of power to the Atomic Energy Commission's new project near Paducah, Ky., Electric Energy, Inc., has won the electric industry's highest honor, the Charles A. Coffin Award for 1952.

Electric Energy, Inc., is composed of five operating electric companies: Central Illinois Public Service Co., Illinois Power Co., Kentucky Utilities Co., Middle South Utilities, Inc., and Union Electric Co. of Missouri.

Ralph J. Cordiner, president of General Electric Co., made the award presentation to J. W. McAfee, President of Electric Energy, Inc., in ceremonies conducted during the Institute's 21st Annual Convention in Atlantic City. Mr. McAfee is also president of Union Electric Co. of Missouri. B. L. England, President of the Institute, presided.

Emphasizing that a pattern had been set for similar coalitions of electric companies to supply quantities of power larger than any one utility could supply alone, the award citation called attention to Electric Energy's "eminence as a prototype of an electric utility organization that can take on enterprise of great magnitude in the public interest without subsidization by the taxpayers of the nation." The citation also commended Electric Energy for its contributions to national defense, "its superb example of competitive enterprise," and its "demonstration that American industry can take the long view in adapting itself to the new age."

### Rapid Organization

In October, 1950, the leaders of the five electric companies learned that the Atomic Energy Commission would require about 1,000,000 kw of electric power for the Paducah plant, later revised to 2,000,000 kw. Though this power demand was so large that it was impossible for any one of the companies to arrange the necessary financing or to supply the vast amount of interim power required, the five utility leaders quickly realized that by concerted action, consolidation of resources, and sharing of responsibilities they could make a major contribution to the national defense effort; demonstrate the vigor, capability, and foresight of electric companies; and accomplish a task of great magnitude and far-reaching economic and social implications.

By December 13, 1950, a $100,000,000 corporation had been formed. Financial arrangements were pushed to completion, construction of a giant new generating station was begun at Joppa, Ill., and final contracts with AEC were signed in May. Negotiations, financing, and designing of the generating plant and interconnecting lines moved rapidly ahead. By the end of 1952, major obstacles had been overcome and the successful completion of the project was assured.

The AEC's demand for interim power grew from 150,000 to 200,000 kw, and Electric Energy was able to supply this demand as it increased because the five participating companies, at their own expense, rushed to completion a whole new chain of transmission lines, totaling some 200 miles in length.

Electric Energy, Inc., was selected as recipient of the Coffin Award after a nominating panel, representing every section of the nation, had carefully reviewed the accomplishments of operating electric companies in 1952. From those companies, the winner was finally chosen by a committee of judges composed of Dr. James R. Killian, Jr., President of Massachusetts Institute of Technology; C. W. Kellogg, Past President of the Institute; and Mr. England.

Established 31 years ago by the Charles A. Coffin Award Foundation in honor of General Electric Co.'s first President, the Coffin Award consists of a gold medal and $1000 for the winning company's employee benefit fund. It is presented annually in recognition of outstanding achievements and to inspire electric companies in their efforts to advance the industry and give best possible service to their customers.

J. W. McAfee (right), President of Electric Energy, Inc., holds the citation naming his company winner of the Coffin Award. Ralph J. Cordiner (center), President of General Electric Co., award donor, made the presentation in a ceremony presided over by retiring Institute President B. L. England.

# Labor's Interest in Free Enterprise

**D. W. Tracy**

*International President, International Brotherhood of Electrical Workers*

An address before the Twenty-First Annual Convention of the Edison Electric Institute, Atlantic City, N. J., June 1, 1953

LABOR and management today generally recognize that each has a permanent and proper place in the industry and that both have a contribution to make. A mutual relationship exists between the separate interests of management and labor in the electric light and power industry, and there has been an encouraging development of harmonious labor-management relations in the industry.

I want to begin my discussion with the unqualified statement that the great bulk of American labor fully supports the principles of our free enterprise system. And what is more, my experience with many different phases of American labor convinces me that this support is based on the genuine and bona fide belief, held by labor, that the free enterprise system is in its own best interest.

### Opposition to Extremists

This is not a new idea. The long history of the American Federation of Labor, with which the International Brotherhood of Electrical Workers has been affiliated since 1891, is a record of continuous and successful opposition to extremists of all kinds. Many people think of labor only in terms of strikes, wage demands, and labor laws. It would be well, therefore, to give a short account of labor's defense of free enterprise and its battle against powerful enemies of that system. The Federation had its origin in a contest with the secret organization known as the Knights of Labor, which came into national prominence 75 years ago. The American Federation of Labor prevailed, because it was founded on legitimate trade union principles, without secrecy and without ambition for political office.

At the turn of the century, the Federation was in another fight, this time with the socialists, who made a determined effort to take over the Federation and its affiliated international unions. The socialists demanded that labor abandon its support of the free enterprise system and called for a

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program of public ownership of the means of production. The program of the socialists was decisively rejected at that time, and they have never regained a position of influence in the AFofL. Later, the International Workers of the World (also known as the "wobblies") tried to sell the idea of "one big Union," but after a short and violent career disappeared from the scene of American labor.

When the communists started their drive in this country, during the 1920's, their chief target was the working man and his organizations. Long before the communist problem was a national issue, it had become a very real threat to the progress of American labor. Before, during, and after the great depression, the American Federation of Labor fought relentlessly against the subversive forces of communism, and today the communist influence in the Federation is virtually nonexistent.

American labor has viewed the problem of communism on a world-wide basis, and has extended its battle against the common enemy into foreign countries. We have given freely of our own time, money, and effort in this world-wide program. We have stationed labor representatives in the countries of Europe and Asia, most directly exposed to Russia's propaganda and threats. Neutral observers have credited these labor representatives with outstanding effectiveness in preventing the spread of communism, and they have been particularly successful as spokesmen for our system to the workers and their leaders in foreign countries.

### Backing for Propaganda

It must be recognized that the threat of communism is most serious because its propaganda is backed by the material resources of Soviet Russia and its global network of subversion. There is a contest going on between the forces of freedom and communism for the support of world opinion. The winning of this contest for world opinion is just as important as our military build-up, to prevent military aggression. We should not delude ourselves into believing that we can hold world opinion on our side by words alone. We must make a continuing demonstration that the ordinary man is actually better off under our free enterprise system.

The American Federation of Labor believes this to be true. That is why we have done more than battle subversives and cope with extremists. That is why we have proposed and developed what we believe to be a good, constructive program to make the free enterprise system work more effectively.

The basic fundamentals of free enterprise are private contract and freedom of choice. There was a time, in the day of handcraft industry, when individual bargaining between employer and employee worked out satisfactorily, because bargaining power was reasonably equal. With the rise of the modern corporation it has become necessary to equalize the bargaining position of employer and employee through the self-organization of the employees and through collective bargaining.

Collective bargaining has strengthened the free enterprise system by

making workable the private contract method of determining wages, hours, and conditions. When an individual workman makes an individual contract with a large-scale employer he is at a disadvantage. The individual workman has little or no bargaining power and will, therefore, work on the terms established by the employer. But if the workers are organized, they acquire bargaining power, and it is then possible to negotiate, through the private contract method, an agreement which establishes wages and conditions of employment which are fair to both employer and employee.

The free enterprise system cannot be a one-way street. Collective bargaining is a basic requirement to permit the system to operate in a manner which is fair to both management and labor. There are some in management, even in this industry, who do not understand this. The refusal to recognize this fundamental point is, in my judgment, a real disservice to the cause of free enterprise. We, in labor, believe that we serve not only our own cause but also the free enterprise system, when we make efforts to establish collective bargaining procedures with such employers.

And I will concede that there are some in labor who do not understand that with power must go responsibility. Our system of government is a matter of checks and balances, and this is one industry which has learned that if economic power is exercised without restraint, the American public will apply a strong check.

I have reviewed briefly the historic position and attitudes of labor towards free enterprise. The International Brotherhood of Electrical Workers, which I have the honor to serve as International President, has played an important part in that history during all of these years. It is entirely logical, therefore, that the Brotherhood should oppose the further extension of public ownership in the electric light and power industry.

We cannot support the extension of government into the business life of the country merely to increase government responsibility and duplicate existing privately owned facilities which are rendering satisfactory service to the public. It has become more and more apparent that the advocates of public power are no longer content with the program originally endorsed by the American people. They have sought to go far beyond that program and have advanced proposals which would have the effect of supplanting free enterprise with government ownership in the power industry.

We, of course, recognize the realities of the situation. The government has a proper place in developing power resources when private companies are either unable or unwilling to do the job. Indeed, we supported the action of the Federal government in constructing such projects as TVA and Bonneville. Projects of this type provided power available through no other means.

The Brotherhood has specific reasons for opposing the further extension of the public power program. For example, in one state collective bargaining relations were well established between the International Brotherhood of Electrical Workers and all the private power companies. Shortly after the power facilities were turned over to public ownership and operation, there were no legal contracts covering these workers and collective bargaining came to an end. The politicians in charge of these enterprises asserted the soverign position of government to determine the wages, hours, and working conditions by administrative order rather than by contract.

In another state, where the power facilities were changed from private to public ownership, the public management took the position that the workers had become government employees, thereby losing their right to strike. When the workers sought to exercise the rights they had under private ownership to secure recognition for collective bargaining and to retain their labor agreement, they were enjoined by court order. Many other instances have occurred resulting in the destruction of unions and the elimination of collective bargaining.

It cannot be denied that public power came into being because private power was not doing the job demanded by the American people. That charge is not valid today. The private companies, for the most part, recognize the necessity to render adequate service at fair rates. As long as they continue to do so they will merit and receive the support of the great American consuming public.

But let us all face the hard facts. In the last 35 years we have seen the peoples of great countries, throughout the world, surrender their principles to dictatorships of the left and the right. Even in those countries which remain free, such as England, France, and Italy, the proportion of enterprise operated by the government and the percentage of the population employed by the government is very high. Pressures in this country toward public ownership continue, with varying degrees of strength at different times. Those who believe in the free enterprise system cannot afford to relax. They must continue the day-to-day job of supporting the system, and, above all, making it work in the interests of the consuming public and the working man.

Labor's interest in free enterprise is not based on theory but is founded on substantial and bona fide considerations. Labor supports our free enterprise system because we believe that the system has worked and that it will continue to work in providing a greater degree of freedom and prosperity than any other economic system so far devised on this earth.

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## Edwin Jowett

EDWIN JOWETT, 83, former Vice President of Kansas City Power & Light Co., died recently at his summer home in Asheville, N. C.

Mr. Jowett came to this country from his native England in 1893 and was employed by a steel company in Illinois before joining the Commonwealth Edison Co. as an engineer in the operation of steam and power stations. He represented that company in England for the purchase of a steam turbo-generator which was the largest built and operated at that time.

In 1914, Mr. Jowett was selected by Frederick Sargent, a leading power plant designer, to assist in building up and operating the properties of the Texas Power & Light and Fort Worth Power & Light Companies. He joined Kansas City Power & Light as superintendent of production in 1918 and six years later became vice president in charge of production, a position he retained until his retirement in 1934.

Mr. Jowett was active in numerous business enterprises in Miami Beach, Fla., his permanent home since his retirement, and held membership in civic and social organizations both there and in Kansas City, Mo.

# Your Financial Community

**Edward T. McCormick**
*President, American Stock Exchange*

An address before the Twenty-First Annual Convention of the Edison Electric Institute, Atlantic City, N. J., June 2, 1953

THE subject of the financial community is a very short topic, but on reflection we must agree it covers a terrific amount of territory. I shall make no attempt to cover the allotted ground in detail but shall restrict my discussion to a few problems that the financial community and the issuers of corporate securities have in common. More particularly, I shall direct my remarks to the increasingly significant and difficult problem of raising new equity capital.

This problem occurs, so far as we are concerned, in two ways: (1) when a new and relatively small enterprise needs venture funds, and (2) when a seasoned corporation desires to obtain fresh funds for expansion or for providing a proper base for its debt financing.

Fortunately, the seasoned, successful corporations, particularly industrials, have to a great extent been able to provide equity for expansion, higher cost replacement, and other needs out of accrued earnings, from depreciation and other like sources. Even here, however, the highest tax burden in our nation's history has been having its impact, cutting into earnings which otherwise might be accrued. And the availability of such earnings will, unless a more realistic tax program is put into effect by the administration, ultimately drastically reduce this source of financing.

### Scarcity of Venture Capital

It is when insufficient accrued earnings are available that the problem of equity financing rears its head in its direst form, and the difficulty of obtaining fresh venture money becomes most evident.

By reason of the progressively increasing tax burden over the past two decades and more, the old well-springs of venture capital have been drying up, and it has been necessary to search for new sources. The higher income groups, which at one time were the favorite source of such funds, have found that that portion of their annual earnings which might otherwise be invested in new enterprises, or in the expansion of seasoned companies, has been taken by the tax collector. And such excess investment funds as remain after taxes, and are available for investment, are finding their way into tax-free and tax-sheltered investments, on the theory that such investments present a sounder haven for the preservation of their capital and, though the yield be low, a greater net return after taxes than could be obtained from holding an equity security producing a higher return before taxes.

EDWARD T. MCCORMICK

Married couples who have a net income exceeding personal exemptions by $32,000, can, at the present time, for example, receive a higher net return from an average high-grade tax-exempt municipal bond than from an average common stock. And this is particularly true in the case of an individual in the highest income bracket, who must receive a return from a taxable investment of about 29 per cent, before taxes, in order to equal the return from a high-grade municipal bond. You can imagine, then, the problem that confronts any salesman attempting to persuade such persons to buy common stocks for dividend income.

To the extent that individuals in these tax brackets do invest in equities, their interest is essentially in capital appreciation. The difficulty that rises in this context is that once these funds are invested, and the investment banker has done such a good job that the investment proves successful, the funds are for all intents and purposes removed from the market place. This is because the present capital gains tax requires that the investment be held for six months and a day, or else the gain that accrues is taxed as ordinary income. And even after the half year has expired, the funds remain locked in generally because of the common aversion to reducing any substantial portion of one's capital by 26 per cent.

### Basic Prop of Economic System

Equity capital is the basic prop of our economic system. And those who, in the past and at present, have been willing to take the calculated risk involved in supplying such capital to corporate enterprises have been responsible in large measure for the growth of our industry and for our present preeminent standard of living. Continued equity investment on a large scale is essential not only to maintain our present productive position, but also to contribute to the growth of new business that will be necessary to prevent our economic machine from stalling. Such equity investments are the lifeblood of our economic system and are critically needed, particularly at the present time, to ensure that our corporations will not become too dependent on debt, and thereby subject to disastrous consequences in the event of business readjustments.

A recent National Industrial Conference Board study shows that the investment per worker in all manufacturing establishments has about doubled in the last six years. In 1945, the capital invested for each production worker was about $5,700. In 1951, this figure increased to approximately $11,-

000. In the oil, chemical, and public utility industries, the cost of new plants and equipment averaged over $30,000 per worker. And, in the new United States Steel Plant at Morrisville, Pa., it is estimated that the original investment per worker will amount to $90,000.

Assuming an annual increase of 3 per cent per year in gross national product, and capital formation of 15 per cent of gross national product, it is estimated that in the year 1960 approximately 60 billion dollars in gross private capital formation will be required.

Where will this capital come from? Retained earnings, depreciation, etc., must, of course, supply a major portion of it, as they have in the past. However, as we have noted, retention of such earnings by business is becoming increasingly more difficult, because of the heavy tax burden which removes a major portion of gross income, and because of stockholders' rightful insistence that dividends be paid.

### Taxes Restrict Investment

As we have seen, taxes have also restricted equity investment by the high and middle income groups, who have found, for the most part, that the earnings they might otherwise invest in equities are taken by the government, and that investment in dividend-paying common stocks is increasingly less attractive, since a major portion of the dividends paid is taxed out of their hands.

In the years 1946 through 1949, for example, nonfinancial corporations obtained, on the average, 64 per cent of their capital from retained earnings, only 6 per cent from new equity financing, and 30 per cent from debt. But mark the trend—in 1951, such capital was derived 43 per cent from retained earnings, 6 per cent from new equity financing, and 51 per cent from debt. To put it another way, new equity capital from the issue of stock has amounted to less than two billion dollars annually since the Second World War, while corporate debt has increased 71 billions.

This great increase in corporate indebtedness, caused in large measure by the shortage of adequate venture capital, presents a serious danger not only to the corporations thus forced to saddle themselves with such loans, but to the entire national economy as well. This danger is a real and threatening cloud overhanging us. Such excessive reliance upon debt as a source of fresh financing is both abnormal and unhealthy.

The venture capital outlook is indeed gloomy under present circumstances. New sources have not come into existence in a volume sufficient to compensate for traditional sources which are drying up. Investment companies through aggressive selling have tapped new investment sources and have become purchasers of equities, and in all likelihood will continue to do so. But this is still a relatively small source of funds and, with the exception of a few investment companies, the monies obtained are invested in seasoned securities, with long dividend-paying histories, and not in the common stock of new enterprises.

There is also the possibility that many states will follow the lead of New York and, by legislative action, broaden the list of legal investments for fiduciaries to include common stocks of certain corporations.

Perhaps the largest untapped source of fresh equity money is in the hands of the lower and middle income groups whose total savings have increased so greatly over the past decade. While some members of this group hold equity securities directly and others hold them indirectly through participation in pension trusts, mutual funds, and other means, it is estimated that by far the greater number are not equity security holders and are generally indifferent toward the purchase of common stocks.

Combating such indifference presents to the securities industry and to corporations an extremely difficult but also a challenging task, one that will call into play all the educational and psychological talents we can muster. It will require not merely the instilling of confidence in those who have it not, but also the imparting, in simplified language, of information as to the nature of common stock, its rights and risks, and its potentialities for the maintenance or appreciation of values and the receipt of income. Those who can afford to buy common stock, and their number is known to be large, should be roused from their lethargy, and informed that equities provide not only an appropriate but an advantageous means of investment in combination with their other media of insurance, government bonds, savings deposits, etc.

It is apparent from available statistics that liquid funds are available in the hands of individuals for equity investment. Liquid savings of individuals in 1952, as estimated by the Securities and Exchange Commission, totalled 14.6 billion dollars. And total liquid assets of individuals at the end of 1952 have been estimated at 359 billion dollars. This figure does not represent any investment in corporate securities, and 212 billions of the total represented cash or the equivalent of cash, namely, savings bonds, savings and loan shares, and bank accounts.

To tap this huge reservoir of funds a sweeping educational program must be done, and to some extent has already been instituted. But the financial community cannot do the job alone. It is one thing for the financial community to educate the public generally in the benefits of common stock investment in the general public interest, but we cannot by ourselves remove the impediments to such investment caused by existing tax legislation. Part of the burden must be borne by our representatives in the Federal government.

### Congressional Action

While nothing significant has as yet been done directly by the new administration to remove the road blocks to equity investment set up by previous administrations, it is sincerely hoped that in the not-too-distant future the following steps may be taken by the Congress to make equity investment both feasible and attractive, namely:

1. Reduction of individual taxes.
2. Abolition of the excess profits tax.
3. Reduction of the capital gains period and the amount of the tax on capital gains.
4. Major reduction or abolition of the double tax on dividends.
5. Increase of the capital loss offset.

While it is extremely doubtful that any alleviation of individual taxes will occur before December 31, this year, I believe that, in the interest of our economy generally, some steps should be taken to relieve corporations and stockholders from the inequitable tax burden they have been bearing.

The excess profits tax, for example, should not be raised from the grave that we so fondly hope for it on June 30. This is a prize example of an un-

just and discriminatory tax, one that has clearly proved itself to be a deterrent to business growth and initiative, and extremely difficult to administer on an equitable basis. Chairman Reed of the House Ways and Means Committee had characterized this tax as a "great obstacle to a balanced budget" and has said also that "the upsurge in tax dollars resulting from the removal of the excess profits tax will more than offset any paper losses which can be ascribed to its repeal." And, although President Eisenhower has recommended that this tax should be extended to January 1, 1954, to retain $800,000,000 in income, he has described the tax as an undesirable way of taxing corporate profits, as one which actually penalizes thrift and efficiency and hampers business expansion, and as one which is especially hard on successful small businesses which must depend on retained earnings for growth.

So far as the capital gains tax, double taxation of dividends, and the capital loss offset proposals are concerned, bills have already been introduced in the Congress by Congressman Richard W. Simpson of Pennsylvania and Congressman Hale Boggs of Louisiana, both of whom are members of the House Ways and Means Committee.

Mr. Simpson's bill, H.R. 3099, would reduce the capital gains period from six to three months, would allow individuals to exclude from gross income not more than $200 of dividends received from domestic corporations, and would increase the allowable capital loss offset from $1,000 to $2,000 a year, with a five-year carry-over of unused losses. Mr. Boggs' bill, H.R. 3686, would go further—it would cut the capital gains tax rate in half, by including only 25 per cent of long-term gains, would allow individuals and fiduciaries a tax credit equal to 10 per cent of dividends received, and would increase the capital loss offset from $1,000 to $5,000. Both of these bills are indeed praiseworthy as far as they go, but I hope that they are only the beginning of the complete overhaul of these and other taxes that is so urgently needed.

So far as the double tax on dividends is concerned, my belief is that we should aim for its complete abolition. Under present tax laws a shareholder is taxed not only on the income of the corporation in which he holds his shares, but, again, when a portion of that income is distributed to him as a dividend. No other form of individual income, whether it be rents, royalties, or interest, is subject to such a dual assessment. To my mind this double tax is one of the prime impediments to equity investment. Probably no greater stimulus could be given to our capitalistic system and no greater inducement given to corporations to slow their rapid accumulation of dangerous debt obligations, than the abolition of this ill-conceived tax.

I favor, as well, reduction in the capital gains period from six months to three months or less, and in addition reduction of the rate of the tax itself well below the present 26 per cent figure. Adoption of such a proposal would be beneficial not only to the Treasury, by reason of the resulting increased volume of long-term transactions, but beneficial as well to investors, the securities business, and corporate enterprises generally.

So far as the credit for capital losses is concerned, in my mind there is no real justification at the present time for continuing a limitation on the amount of such losses that may be credited to income. If a man suffers a capital loss in any year, he should be permitted to offset the entire amount of the loss against income, and to carry any balance remaining over into succeeding years until the loss is completely offset.

For the first time in over 50 years, the Congress is now working on a complete revision of the tax laws. Let us hope that it devotes its attention first and foremost to the abolition of existing inequities. Once manifest inequity is admitted, and inequity has been admitted or is evident in each of the above proposals, then its further continuation against any particular class of citizens cannot be justified on grounds of expediency. Substantial justice requires that the tax burden be borne equally by all of us. Your financial community and its members and customers do not request relief from their fair share of the burden, but protest the failure to adjust inequitable and destructive taxes.

To the extent that these inequities are continued, to that extent will the raising of necessary equity capital be retarded, the reliance upon debt financing be increased, and the preservation and development of our capitalistic system be endangered. Britain and Canada, in the interests of industrial expansion, have already reduced their taxes. Neither of them have ever had a capital gains tax, recognizing such gains for what they are, as increases in capital and not income. Canada, furthermore, has seen fit to grant and then to increase a credit on dividends received, as a means of facilitating and inducing equity investments. It is high time for us to do at least as much.

# EEI Publications

### EEI-NEMA Standards for Distribution Transformers

EEI Pub. No. 53-1. A report of the Edison Electric Institute and National Electrical Manufacturers Association on Standards for Distribution Transformers. 40 pages. Price: $1.00 in USA and $1.20 to foreign countries.

This *Fifth Report* contains design standards for certain mechanical and electrical features of overhead-type single- and three-phase distribution transformers rated 500 kva and smaller, high voltage 67,000 v and below, low voltage 15,000 and below.

### Bibliography of the Heat Pump Through 1951

EEI Pub. No. 53-4. Compiled by the 2701st Research and Development Unit at Battelle Memorial Institute for the Signal Corps Engineering Laboratories and published under the sponsorship of the Joint AEIC-EEI Heat Pump Committee. 32 pages. Price: $1.00.

This bibliography presents a listing of reference materials on the principles of operation and application of the heat pump, its references including articles, books, and miscellaneous publications published through December 31, 1951.

### Resistance Furnaces

EEI Power Sales Manual, Chapter 34, Copyright 1953. 32 pages. Price: 75 cents per copy. Quantity prices upon request.

Many factors must be carefully analyzed to insure that industrial use of the electric furnace results in overall advantage to the user. The information presented is intended to provide a background of knowledge to aid (1) in recognizing good applications and (2) in preparing preliminary evaluations of available equipment and anticipated power consumption for a particular set of operating conditions.

# What the Security Analyst Wants to Know About Your Company

**Marvin Chandler**
*Vice President, Reis & Chandler, Incorporated*
*President and Director, National Federation of Financial Analysts Societies*

An address before the Twenty-First Annual Convention of the Edison Electric Institute, Atlantic City, N. J., June 2, 1953

THE title of this discussion probably should be "What *a* Security Analyst Wants to Know About Your Company," rather than "What *the* Analyst Wants to Know." We are a young calling, but there are now about 1,800 members of the New York Society and about an equal number in the 12 or 15 other societies in this country and Canada. This is probably close to ten times the members a dozen years ago. As a young calling, our techniques are still in the process of evolution, and there is no general agreement as to how to analyze a security, even where the objective is the same. But the objectives often differ, depending upon the investment goal of our employer or his customers. And what the analyst for an investment banker bidding competitively for bonds may want to know, therefore, may differ from the information sought by the analyst for a trust company considering the purchase of stock. So, since I cannot state what 3,600 analysts want to know, I am going to discuss some of the things that I want to know.

Now I am not going to include a list of financial or statistical tables which should appear in an Annual Report, or say that companies should publish quarterly balance sheets as well as income accounts, and the like. I think that with few exceptions the electric industry is doing an excellent job in providing a full disclosure of the facts. Furthermore, our needs along this line are not difficult to ascertain without my itemizing them. The Committee on Corporate Information of the National Federation of Financial Analysts Societies prepared a report this year on annual reports of electric companies which can be obtained from its chairman, Linwood Savage of the New England Trust Co. in Boston. A group of

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members of the New York Society also has recently edited a pamphlet on stockholder relations which has been published by the American Management Association and which might be helpful. Addresses to analyst societies, meeting with underwriters, and interviews with analysts also have given a good idea of our routine demands.

### Unexplored Problems

So what I hope to do is to get off the beaten path where the trees are familiar and get up high enough to try to see the forest. The problems I am going to discuss in general, I believe, are problems which we as working analysts normally cannot or at least do not find time to explore. I think that for some of them the electric utility executive too may not know the answers, and perhaps there may be a means for the analyst and the electric utility executive in the future to consider them and try to solve them together. I shall consider them largely from the viewpoint of common stock, in order to concentrate and perhaps dramatize the problems, but the senior security holder in the long run has an equal interest in them.

It seems to me that aside from so-called special-situation analysis, such as a merger or recapitalization, and short-run analysis, all the facts for which we as analysts search are needed to solve just two major problems—the quantity of future earnings and the quality of future earnings. Those are the problems that we need help on. When they are solved, the executive's job is done but the analyst's is not, for we have another factor to consider, and that is price—that is, the extent to which the quantity and quality of earnings are already reflected in the price of the security.

At that point, the analyst's judgment and experience play a most important part. His final decision now requires a high degree of selectivity, because there are 135 electric company common stocks in public hands, the vast majority of them of adequate size and quality to fill the needs of almost any investor. And he will decide not on the basis of whether a company's problems are being or give promise of being satisfactorily solved, or whether, perhaps because of some private characteristics or external factors, they are not capable of solution by the company, but rather on the basis of whether at the prevailing price of the company's stock he is getting more or less future earnings, quality considered, than he can obtain in any of over 100 other issues.

The range of disagreement among us is wide. At a recent meeting of the utility group of the New York Society, 121 analysts filled out questionnaires to determine their first, second, and third choices for the most favored utility common stocks.

A total of 75 companies were cited, and the ones named the most received only nine first votes. I am sure that no matter how uniform our analytical approaches ultimately become, we shall always have a wide divergence of opinion on the favorite at any one time, and for the industry as a whole, I suspect that that is a fortunate matter.

### Fundamental Questions

With this introduction behind me, let me now turn to those questions which it seems to me are of fundamental importance in reaching the final conclusion as to quantity and quality of earnings, but which we as analysts most need help in solving. They come under five major headings. There probably are more than five, but these are the most troublesome to me. They are:

1. The effect of growth
2. The measurement of recession resistency
3. Regulation
4. The significance of operating factors
5. The measurement of ability of management

Considering the first of these, I think that growth is a factor that is often over-simplified by analysts. Growth certainly is not always beneficial, for the Pacific Coast has been the fastest growing area of the country in terms of population, but this growth generally has not carried through to increasing per share results for electric companies. The telephone industry since the war has had outstanding and continuing growth but the more it has grown, the more it has needed to seek regulatory relief, and earnings per share of American Telephone and Telegraph common have been far below the levels previously attained in periods of high business activity. The result in both cases may be in spite of the growth in the volume of business, but it has been such a persistent and continuing result that one becomes suspicious that it may have been because of the growth.

Perhaps we should try to define or at least delimit what we mean by growth. In my judgment the only growth which is significant to the investor is growth in per share earnings. Growth to me, therefore, is increased earnings per share resulting from an increased volume of business.

Increased earnings per share are not necessarily attributable to growth, and growth does not invariably produce increased earnings per share, as I noted earlier. Increasing earnings can arise from rate relief, but that is not growth. Increased earnings can arise from decreased expenses in the absolute, such as a reduction in the tax rate (let us hope), in the depreciation rate, or a favorable new power purchase contract, but that is not growth. *Decreasing unit* expenses of course may accompany growth sufficiently to raise earnings per share.

Perhaps at this stage, we can stop and frame the question. As I see it, it is twofold: First, "What causes growth in per share earnings to accompany an increasing volume of business in some cases and not in others?" The second corollary question is, "How is such growth possible in a regulated industry?" I shall defer consideration of this for the moment.

I would like to see case studies made of the electric companies which have had the most outstanding growth in earnings per share in recent years, as well as a few which have not, to see just what the causes have been. Has it mattered whether growth was in residential, commercial, or industrial business? Which is more advantageous, an increase in customers or an increase in the load of existing customers? What part is played by the form of the rate schedules? Have expenses been an important factor in the difference in performance among different utilities with similar growth trends? Are good performances merely the result of starting with older and less efficient plant, or with greater reserve capacity throughout the system? Have some companies been able to hold down the new plant investment per new customer better than others?

Now how about the second question, the growth in a regulated industry. It is simple enough to say that growth as I define it is not possible for a utility if earnings start at the allowable level. Why isn't it a fact that no benefit to the shareholder can result if the company is earning 10 per cent on its common capital, its business doubles, its common capital doubles, and it continues to earn 10 per cent on the common equity money invested? I think that I know some of the answers to this question but I would like the executive to tell me where I'm wrong, tell me other answers, and especially, to tell me which of these theoretical explanations was the actual explanation in the cases of the companies that have grown the most in the last few years.

We know that the allowable earnings rate is not a fixed point but a range, and that growth within that range is not only permissible but common.

We know that some utilities have earned less than an allowable rate at times, and perhaps growth has carried them out of that sub-normal into a normal range, although more frequently that type of utility has needed regulatory relief to restore its earning power.

We know that selling new shares to finance expansion at a market price above the book value of the old shares will raise per share earnings even though the return in terms of earnings on book value is fixed. For example, assume that a company is capitalized with $100 of common equity represented by ten shares, on which it is earning 10 per cent, or $1 per share, and that the shares are quoted at $20 each. Increasing demand necessitates raising another $100 of common capital; so five shares are sold. Earnings at the same 10 per cent rate on the $200 of common equity now, however, will produce $20 which, when divided by 15 shares, results in earnings of $1.33 per share. The old investor has experienced a very satisfactory growth. Moreover, if his earnings are capitalized at the same 20 times rate as before (which of course is very high, and was used only to simplify the arithmetic), then his stock will be selling for $26.60 per share, compared to $20 previously. I suspect that this situation may explain a number of the outstanding so-called growth stocks. Certainly the greater the increases in demand, the greater the expansion, the more stock is sold above the previous book value, and, therefore, the greater the increase in per share earnings if the rate earned on book value can be maintained.

We know that the same situation would prevail with retained earnings.

Let's assume the same company again with $100 of common capital represented by 10 shares, earning $1 each and selling at $20. It pays no dividend, but at year-end reinvests the $10 of earnings in new plant. At the end of the second year, it will have $110 of capital earning $1.10 per share and selling for $22 each. Compare this to a counterpart which pays out all its earnings and at the beginning of the second year finances the $10 expansion need by sale of half a new share. At the end of the second year, the $11 of earnings will amount to $1.05 per share, which will sell at 20 times earnings, or $21, and together with $1 of dividend received provide the stockholder with the same $22 of value as if all the earnings had been retained. In other words, if funds in the business are capitalized at twice their book value, this will be just as true of new funds left in by stockholders as of new funds supplied by sale of common. The rise in per share earnings, however, is more rapid, the more funds are left in, merely because of the issuance of fewer new shares.

Continuing our search for explanations of growth despite regulation, we know that some states do not regulate on book value, and in a period of rising prices, rising earnings in those jurisdictions might well be permissible. We also know that some few states do not exercise jurisdiction over rates.

We don't know which of these factors has been the significant one in individual cases of success. Can't we find out?

### Recession Resistency

My second problem was the measurement of recession resistency. I think that our analysis here is not as thorough as it could be with more help from company executives. I don't think that study of 1932 experience is sufficient or even rewarding, when residential usage was a fraction of today's level and when commercial and industrial uses of energy were also greatly different. I want to know first, how stable are revenues? How does the economic stability of a specific territory generally compare with others? Is industrial diversification a guarantee of better-than-average stability? Are small plants and small firms more or less stable than large in times of recession? So far as the industrial load itself is concerned, how much dependence does a company have on one or a few customers or industries? What types of industry are they? What is the nature of the contractual relationship therewith? To what extent would demand charges minimize the reduction in load if business turns downward?

So far as commercial and residential business is concerned, how dependent are these customers on general business and business in the territory? To what extent are their current demands frills or nonessentials which can be cut down? How much of a mortality rate can be expected among commercial customers? How much family doubling up or moving to less elaborate dwellings can be expected among residential customers? I realize that the company's executives may not know the answers here any better than I, but I think that they are in a better position to study the problem. I wonder, for example, if the experience in some of the distress textile areas a year ago would be of any assistance? What would happen to farm load which has grown to be of considerable importance to some companies? Does the company have any wholesale power sales arrangements which would bear the brunt of reduced demands upon the purchasing utility?

After all these revenue questions are solved, how about expenses? How fixed are those of a specific company compared to other companies? Could it shut down much high cost plant which now in effect is supplying its lowest-priced sales? If so, perhaps we should recommend the securities of the company with the least efficient plant which has more to look forward to, whether demand rises and the old plants are replaced by low cost facilities or demand falls and they cease to operate. What about the relative merits of hydro versus steam, comes the recession? Is a company purchasing power which can be cut back, or would its contractual arrangement not permit it? How about other expenses? Where else is there flexibility except in that most flexible cost of all, the income tax?

Finally, even if a company's situation seems less promising than others, is it better protected for it by a large carry-through of revenues to common?

We can answer some of these individual questions ourselves, but I am sure that company executives could help us to a more factual and comprehensive study of the problem.

### Regulation

My next topic is regulation. Probably nothing plays as important a part in our thinking and in that of electric utility executives today as this subject. To a considerable extent, the executives can't tell us the answers. Perhaps in some ways here we can be of help to them.

We are first interested in a company's attitude, whether it intends to seek relief promptly, vigorously, and completely when earnings drop below a reasonable level, or whether it will hold back. I think that we are often impatient with any course but the first I outlined, and if a company does not take an aggressive attitude, we want to know why. It may have excellent reasons for delaying action. Perhaps it can foresee better than we can economic forces which stand a good chance of correcting the situation without regulatory action. It certainly is in a better position than we are to judge the proper timing from the viewpoint of public, political, and customer relations. I think that many of us are too prone to judge the matter solely from the investors' viewpoint. Company executives can help us to see the other sides of the problem which condition their thinking.

We further want to know what a company's philosophy is about regulation. Some analysts are groping for the answers to what is right themselves, and the company's beliefs and reason therefor may help them in their thinking. But more important, its beliefs are a factor in the earnings prospects for its stock. Does it believe in a fair-value rate base, with an element for current construction costs, or is it afraid of the repercussions of this approach in the event of a major reversal of prices? Does it believe enough in fair value to fight for it before the commission and the courts, if necessary? What about so-called economic depreciation? Does the company believe that the income account should be charged

with the present value of the property consumed each year? If so, how much of a fight will it make for it? If not, what is wrong with the theory? How about fair rate of return? If a company disagrees with the so-called "cost of capital" approach, what is the substitute method which it recommends as right?

The value of a company's stock will be affected not only by its thinking and action in the regulatory field but probably even more by the policies of its regulatory commission and the commission's staff. A company cannot read their minds for us, but it can help us in our efforts to do so by keeping us informed of commission opinions and orders in other cases which might reflect their attitude when the company's case comes before them, and by telling us of changes in the personnel of the commission, and the background of new members.

The final word generally is said by the courts, and we want to keep informed of their decisions which would affect a company, immediately or in the long run. I say their word generally is final, because sometimes legislation may get in the last word after the court has spoken. If there are any legislative measures introduced which would affect the future earnings or quality of a company's stock, we certainly want to know their introduction and ultimate fate.

Even with knowledge of the attitude of management, commission, courts, and legislature, we are still faced with the problem of selecting the most desirable investment. I know some analysts who are convinced that the best stocks are those in states where fair value is not only the law but the practice, feeling that assurance of a fair return on fair value provides the best protection for an investment. I know others who say that such may be case, but they believe that when the latter results in a relatively high return on book value, they believe that the risk nevertheless is increased, and they prefer an investment in a company which is earning a sub-normal return, since there is more room for earnings growth. Who is right? Can executives help us to find the answer to this basic regulatory question?

The next major weak spot in our analytical knowledge I have called "the significance of operating factors." Here again I plan to pose a flock of questions. Let's start with the physical condition of properties. I don't believe that any of us want to recommend the securities of a company whose properties are really run-down or obsolete, but is there another extreme, where the properties are gold-plated at the expense of the investors? If so, how do we recognize the fact? When is the point reached when additional expenditures become too much of a luxury?

We can pretend some semblance of a judgment in a physical inspection of a system as to whether a company is a good housekeeper, whether or not poles are leaning, wires sagging, branches untrimmed, but perhaps these economies here are justified in a particular situation, or perhaps the spic-and-span neighbor has gone to the other extreme. How can we tell whether a company's transmission and distribution network is underbuilt or over-built, whether the margin of safety is thin, and, if so, whether this represents lax management or prudent economy?

Executives in the industry talk of a man as a "good operator." What is embraced in that term? How is it measured? What does it mean to the stockholder?

### Ability of Management

This discussion leads me quite easily into my fifth and last topic, which is the measurement of ability of management. There is certainly general acknowledgment that managerial ability is an important criterion in the value of a security and in its prospects. Even the commissions and courts occasionally have indicated that this should receive some consideration in the earnings allowed a company. Certainly this is the case in the form of a penalty for bad management, if not a reward for good.

I believe that our analytical approach to the appraisal of managerial ability is usually extremely limited. Perhaps our first point of judgment is now good the management's program is for furnishing information to financial analysts.

If we are supplied with all the facts we want, if the president gives a good talk at the Analyst Society luncheon or a due diligence meeting, he is a good manager. I think our second point of judgment is personality. If the president bustles a lot, slaps the analyst on the back and calls him by his first name and talks a good game, we are inclined to give him a strong vote of confidence.

I am not trying to underrate the two qualities of financial relations and personality, because I think that a good utility president probably does need both. But on the other hand, couldn't the quiet type, who perhaps is not as communicative with us as we would like, still be doing a bang-up job for his stockholders? But more important, how should we measure management? Are there any quantitative measurements of managerial ability that can be made? How does an *electric utility executive* decide whether or not he or his subordinates are doing a good job?

Should we study customers' accounting and collecting expense per customer, or other such rates? Or is it something broader, like the percentage of gross revenue carried through to common? I have doubts as to the latter as a test of management, since there often appears to be an inherent physical characteristic of the business which causes differences among companies, or certainly causes the wide differences. Or is it an increasing percentage of gross to common over a period?

Maybe the best test is simply the rate of return being realized on the capital invested in the enterprise, or how well the management is doing with the funds entrusted to it. But we all know of cases where this result is in spite of rather than because of good management. Perhaps we should make tests of rates of development of new business, or rates of control of expenses. I am tempted to suggest that the results of a company be charted against the industry performance, except for the fact that the electric industry has furnished us with so many of those charts over the years and I am still waiting to see one where the company in question did worse than the industry. The parts always seem to exceed the sum.

Some evidence of managerial achievement is apparent in the prize awards of the industry such as the Charles A. Coffin Award, but I am

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# Leadership—Its Place in Planning for the Future

**Grover C. Neff**
*President, Wisconsin Power and Light Company*

An address before the Twenty-First Annual Convention of the Edison Electric Institute, Atlantic City, N. J., June 2, 1953

IN planning for the future of our industry, the development of proper leadership is at least as important as the planning we do for new generating stations. The management of each company determines the kind, location, time of construction, and many other things about our generating stations. Management, in fact, is the creator of such stations, and the creator is always greater than the things it creates.

One or more departments of our company organizations are working on generating stations all the time. The men in these departments worry about where, when, and how to build them. A great many people spend days and months working on plans and specifications for such stations, making out detailed time schedules as to when the material is to be ordered, when work on the site is to start, when each major portion of the equipment is to arrive, and, finally, when the plant is to be put into operation. We are fully aware that we must have these stations ready by a certain date, if we are to continue to supply adequate service to our customers.

### Implementing and Expanding

We all give some attention to providing new leadership at the proper time, but I am sure that we do not handle this problem with the same degree of organization and thoroughness that we use in building new generating stations. The question of leadership in our business is vital to the continued success of our industry, and it is important that each chief executive take another look at his own organization to see if he can profitably implement and expand the things now being done to provide future leaders for his company.

When I speak of leadership, I refer directly to the top 2 per cent of all employees in the smaller companies

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or the top 1 per cent in the larger companies and, indirectly, to the entire supervisory forces. Our industry is one of the big industries of the nation, and it is rapidly getting bigger. As electric service is put to more and more use in homes, stores, and factories, we are becoming more and more important to more and more people. The standards of service, already high, will become higher, because our service plays such a big part in the life of each individual. With this growth, our opportunity for usefulness increases, but along with that goes increased responsibility. It is essential that we so conduct our business that the public continues to be reasonably satisfied with it. This means not only supplying good service but also carrying on whatever operations are necessary to keep the public sold on the fact that our service is reasonably good and our rates are reasonably low. All the problems we have today are going to get bigger as we grow and expand, and this makes more important the selection of properly qualified men and women for the management jobs.

Many heads of electric companies held important positions of leadership as far back as 1920. At the end of 1920, there was invested in the property and plant account of the electric operating companies of the United States less than $4,000,000,000. At the end of 1952, this same plant account had increased to approximately $23,000,000,000, a gain of about $19,000,000,000. This growth has taken place during the active company lifetime of the old-timers who are quite well acquainted with the many problems that had to be met and solved. In 32 years, the size of the industry has been multiplied approximately six times.

Now it is estimated that during the next eight years the plant account of these electric operating companies will increase nearly as much as it did during the past 32 years. In other words, our companies will have to raise nearly as much money in the next eight years as they raised in the past 32 years. They will have to build property at a greatly accelerated pace. If this is to be done, the earnings of these companies will have to be maintained at a satisfactory level, which will probably involve rate increases with all of the problems connected with such an activity. We need the very best men and women we can find to take over the leadership of this industry when, for one reason or another, vacancies occur. It is probably the most important single development which confronts us today.

### Re-examination of Departments

If we tackle this problem in the same efficient way our industry has tackled its engineering, accounting, and financial problems, then there is no question as to what the result will be. But, in order to do this, we will probably have to re-examine the departments in our several companies

which give attention to personnel problems, employee problems, and public relations problems. These departments are very important and can do good work for and with the rank-and-file employees. However, when it comes to training and developing men and women for the leadership jobs, the very top management people must actively cooperate with these departments. At a very early stage in the development of people for the leadership jobs, the president and the vice presidents should become personally acquainted with the candidates, should talk with them from time to time, take an active interest in their development, and let them know it. This will not only help top management to make selections for the leadership jobs, but will also help enthuse the candidates to do the best they can.

Each executive should think back to his own early experiences. What led him to broaden his knowledge of the business? If he is or was an engineer how did he become acquainted with the accounting operations of the company? How did he learn its financial operations that had to be handled successfully if the company was to grow strong or even to live? What gave him experience with rate policies, sales policies, labor relations, contractor-dealer relations? Who guided him in franchise matters, in dealing with the staff members, in making appearances before the Public Service Commission, and in newspaper and public relations?

He should remember the turning points in his career. Didn't some older person in the company give him some real insight into the way of doing business? Possibly someone showed him how to handle a problem that was baffling him, or what was wrong in something he worked out. Some leader gave him valuable pointers to guide his future efforts, or spoke appreciatively of his initiative and industry, or gave him a pat on the back when he had done a good job. These boys who are to be our future leaders are made of the same stuff and have the same feelings and aspirations that the present executives had. They are not only capable, but they are ambitious, and they keenly appreciate every opportunity for improvement. If such opportunities are lacking, either they will leave us or their potential for growth will be weakened.

In the executive's recollection of his own progress, it is unlikely that he can recall any lasting benefit arising from insincere attention from his superiors or the mere appearance of interest. Nor did he gain much from training operations that involved no real responsibilit.es, no struggle to master difficult situations. His growth came from displays of real interest in him and his work, from real opportunities, real difficulties successfully mastered. If he was helped to grow and develop to the stature of leadership by that process, why not apply that experience to the problem of supplying our industry with future leaders who will measure up to the big job of management in the years ahead?

Our customers are interested in the leadership of our companies, for, with the proper kind of leadership, they will get good service at reasonable rates. Our stockholders are vitally interested in this question of leadership, for they know that good leadership means dependable and proper dividends. Our employees are also interested in the right kind of leadership, because they then work in an atmosphere which is pleasant, and it is always good to be working for a successful company.

### Recruiting Potential Leaders

Whenever we decide to build a generating plant, we make plans and write specifications, and we know in advance just what kind of a power plant we are going to have. When a manufacturer designs a new product, he is very careful about the specifications and the selection of his raw material to be sure that it will give the desired qualities to his finished product. It seems to me that it is just as important to have specifications to guide us in selecting people to be developed for positions of leadership as it is to have specifications for a power plant. And here are some of the qualifications that seem to me to be important in such specifications:

1. Good personality; the willingness and ability to work well with other people, both employees and customers.
2. Good judgment; leaders have to make many decisions, and it is important that these decisions be wise and right.
3. A fair attitude; the principle of playing no favorites, but treating everyone alike.
4. Courage; both zeal and skill to defend the company and the industry against unfair and unwarranted attacks.
5. Good character; he must win and deserve the respect of those who work for him.
6. Ability to get things done; he must assign work clearly and wisely, follow it through closely to see that bottlenecks are broken. He uses every legitimate means to overcome obstacles.
7. Knowledge of his business; he cannot intelligently direct a company or department unless he thoroughly understands the many problems of that company or department.
8. Humility; this should not be confused with laxity or softness. A cocky, proud leader will not get the best performance out of his people. The greatest leader of all time, born 2,000 years ago, was very humble.

Now, no man can have all these qualities and be perfect in each, but men can be found who have a passing grade in each characteristic and a fairly high average grade for all. Our job is to find these people; first, on our own pay rolls; second, in the graduating classes of our colleges; third, among those who have received their education from the school of experience but who may not now be on our pay rolls. It makes no difference where they come from. It's what they are that counts.

If we are to have an adequate supply of leadership material, we should make an inventory of our own people, pick out those that seem to have the required qualifications, and try to develop them. It will also be necessary to recruit new people who have the fundamental qualities of leadership. The best but not the only source of these is students graduating from college. Now, how are we to get these men and women who are finishing their college education? We must have a definite plan, and we must prepare a story about our industry and our individual companies that will appeal to these graduates. This presentation should aim to convince the student—

1. That the electric business is a good business to be in. It is a fast-growing business. It is interesting because it deals with people. It is a stable business. It has a future that looks good.
2. That the company has a definite training and development program, a cadet program, or some other similar program. This should be set forth in some detail on paper, so that it is easy to understand. It should be explained that the work of the new employee will be reviewed at least annually, and that his progress and possibilities will be discussed with him.
3. That the starting salary is in line with what others pay for comparable work.
4. That we are particular about whom we hire, but that once we hire somebody, we do not put him on the shelf and forget about him. Once hired, his work will be carefully followed.

It is always advisable to go over the presentation with the proper college professor at the school where the company intends to solicit candidates. At this interview, the object is to sell the college professor on the plan and on the sincerity to follow it through. Then at least two weeks before going to interview seniors, send the professor copies of the presentation which includes the entire plan so that he can determine how many seniors are interested. One company that has used this approach for seven years finds that it is easy to get college seniors interested in the electric business. In one year, more than 100 seniors in six colleges were interviewed, although only five men were to be hired. To get this kind of response requires a well-planned, efficiently executed selling job. We do this in other things, so why not use the same methods in selling the advantages of a job in a company?

Once hired, a man should get a real test to see how he performs under fire. Here it is very important to keep accurate and adequate records of each employee that the executive thinks, in time, can hold down a leadership job. These records apply not only to the men who have been hired under the cadet plan, but also to the men and women who are now on the pay roll. Some of them may be college graduates and others may have gotten their education through the school of experience. Each one's record should be reviewed with him at least once each year—every six months is better. He should be told how he is doing, praised for the things he has done well, and given helpful criticism on the things he has not done well. If he is the kind of a man the executive wants him to be, he will appreciate this kind of treatment and will improve in his work. This will hold his interest in his job. He should be promoted as soon as his capability justifies it and an opportunity presents itself. If this policy is followed, a company will not lack for well-qualified men and women to fill the top 1 per cent or 2 per cent of jobs as they become vacant.

I have set forth here, in some detail, my own views as to how we can develop proper leadership for our companies primarily to show that this selection and development process requires considerable manpower, definite company organization, and the top executives' personal attention. Another plan may be very different from mine, and it may be better. The point I wish to make now is that it is very important to have a definite, well-organized plan. If a company already has such a plan, I suggest that the executives take another critical look at it. Think about this problem as one of the major problems that confronts a company, and see if the company is set up to give it proper attention. How closely does the president and vice president follow the work of the personnel department? How much time are top executives giving to the question of finding, training, and developing men to be their successors? The responsibility for filling these leadership jobs rests squarely on the shoulders of top management.

As our business grows, each one of the top jobs becomes more and more important. The future success of our industry depends on the kind and type of men and women we put in these jobs. The present leaders of the electric operating companies have this great responsibility. We must do whatever is necessary to get a sufficient number of the right kind of people properly trained and prepared to take over the leadership of these rapidly growing companies.

## What the Security Analyst Wants to Know

(*Continued from page* 243)

sure that there are more well-managed utilities than the few who can be so recognized each year, so that is not an all-inclusive test.

Another field for crediting management is in demonstrated initiative and resourcefulness, such as the conception and execution of the Joppa project, leadership in atomic research, high-temperature boilers, high-voltage transmission lines, outdoor plant construction, and other engineering innovations. Accounting initiative may appear in introducing bi-monthly or postcard billing, financial leadership such as in introducing the over-subscription privilege, etc. Certainly there are tangible evidences of good management.

Good management should be apparent in the esteem in which the company is held in its community by public and political leaders. This was one of the outstanding impressions I gained in a week's trip over the properties of a large southeastern system last fall. It also may be revealed by the nature and force of opposition, if any, to a rate increase application.

Perhaps some tests can be made of the investors' acceptance of a company's securities. If it raises its capital and its securities sell on a better basis than those of similar utilities, is not this a recognition of good management? But this begs the question, because my premise is that the investor and his representatives are not adequately equipped to judge managerial ability. I have indicated some possible approaches but I am sure that electric utility executives can be helpful in guiding us to better management appraisal techniques.

In my discussion of *one* question—"What does the analyst want to know about your company?" —I have asked a hundred. Posing them was easy. The hard part is giving the answers, and that's what I am leaving to company executives.

# Leadership and the Electric Industry

**Dr. Horace Hildreth**

*United States Ambassador to Pakistan*

An abstract of an address before the Twenty-First Annual Convention of the Edison Electric Institute, Atlantic City, N. J., June 2, 1953

ALTHOUGH I may not know very much about the electric industry, I am confident that my thinking about leadership in industry is closely allied with the thinking of most electric company executives.

I could prove this by long statements evidencing my philosophy and action both as Governor of Maine and President of Bucknell University. But I think I can best prove it by recounting a story.

This story relates to the English politician representing the Labour Party a year and a half or two years ago, just prior to the election that put the party out of power. He had made a very moving speech telling the audience of the benefits of socialism, the benefits that had been conferred upon his constituents, and he wound up triumphantly with the statement, "How do you account for the fact that England in the past year has had the largest and healthiest and finest group of babies in its history?"

And he waited triumphantly for the full implication to sink in, but, unfortunately, from the rear row came a bellow, "Private enterprise!"

### Basis for Belief

Now I believe in private enterprise with a passion, not merely because I can make a dollar under it—although I am very glad to make a dollar and certainly am one of those who, even though in the academic field, believe there is no crime in making a dollar if it is possible to do so with honor. But my fundamental belief in the private enterprise system has as a basis my firm conviction that it results in the greatest good to the greatest number. My experience in government makes me shudder at the stupidity and lack of perception of those—many of them well-meaning and sincere people but without the slightest appreciation of or experience in private competitive industry—people who have their minds and their hearts so moved by the evils they have heard about in private enterprise in the capitalistic system that

DR. HORACE HILDRETH

they cannot see its advantages. Somehow they think that if private enterprise could be done away with and all power given to the government, the government would wear a halo and evils would be dispensed with.

All people crave power, and it may well be that the power of the dollar has been abused in the public life of America and in other countries having a free private-enterprise system. Nonetheless, when power shifts from the dollar to the ballot, the same weaknesses and abuses will be found in those controlling life through the power of the ballot or through government directive without a ballot as exist in the human beings who have the power of the dollar. All we will have accomplished is the shift in the medium of exchange.

It seems to me, however, clear as crystal that if the power of the dollar and the power of the government both are concentrated in government, we will have more rather than less abuse of power. There is an old-fashioned, familiar saying that power corrupts, and absolute power corrupts absolutely. With the free-enterprise system the power of a dollar is always subject to control and regulation by the will of the people through government as, perhaps, the electric industry very well realizes. But if the people, through socialistic measures, are forced to give most of their income to the government and then merely sit by and hope that government will be beneficial and kindly in returning benefits to the people, we are going to find with great rapidity, as history all too clearly proves to those willing to learn, that productive efforts of the people are used not to provide the greatest benefits to the greatest number, but rather to provide the greatest power to the fewest in number.

I see a great similarity today between the position of the United States in world politics and the position of private industry—including the electric industry—in the American domestic scene. Recently as Mrs. Hildreth and I took a taxi ride over the route of the Coronation parade, I was struck with the disintegration of the power and leadership of the British.

For instance, it was amazing to me to learn a few weeks ago while I was in Pakistan that in Pakistan and India alone the population exceeds the population of all the United Kingdom plus all the population of Soviet Russia plus all the population of the United States. Yet those two countries achieved independence from England only as recently as 1947, and a distressingly small percentage of the people—perhaps only 12 per cent—are literate. With the departure of England's leadership—say what you will about it for good or bad—where will the leadership for these hundreds of millions of people come from? How good will it be, and how rapidly will it be forthcoming? Those questions are of vital concern to us in American life and to the entire free world. Will the thinking of these 400,000,000 people, like the thinking of the vast population of China, come under the vindictive, vicious, hate-thinking of the Communistic Party?

We all know that Russia particularly likes a power vacuum. Space does not permit an elaboration of these thoughts, but a mere reference to the

questions I have asked seems to carry adequately their full significance.

So now I turn from those thoughts to the situation of leadership of private industry in America today. In America for 20 years, either directly or indirectly, private industry has been castigated and government exalted largely for political purposes. Now we have a reversal in political thinking, though by a very narrow margin, and private industry has a heavy responsibility. With the withdrawal of the power and leadership of England in world politics, the United States, unwilling and unprepared, regretfully, must assume the problems of free-world leadership. After 20 years in the United States, during which leadership was constantly expected to come from the government, we now find private industry invited to take an increasing part in the leadership of our life. Will the leadership of America in world politics and the leadership of private industry in domestic politics be adequate to meet today's problems?

### Problems of Quantity

First let me give a little capsule statement bearing on the problems of the quantity of leadership needed in the United States. From the foreign edition of *Time* magazine, which I picked up in Syria, I cut from the educational section the following item:

> The United States is used to boasting about its wealth and progress, but is it training enough people to carry them on? Last week, in a special report—*A Policy for Scientific and Professional Manpower* (Columbia University; $4.50)—the National Manpower Council at Columbia University's Graduate School of Business gloomily answered no. The supply of trained minds is lagging way behind the demand.
>
> In 1952, the nation was at least 25,000 engineers short. It had only 18,000 physicists; only 3,500 of them have Ph.D.s. It needs at least 53,000 more teachers, by 1960 will face a shortage of between 22,000 and 45,000 physicians. Most alarming figure of all: of the nation's 700,000 scientists, a mere 15,000 are engaged in basic research.

That is the capsule statement of the problem of trained minds—not necessarily leadership management, for leadership management will come to a very appreciable extent from the group to which I have referred.

Now let me quote from EEI President B. L. England on the quality of leadership needed in private industry. In *Electrical World* of April 6, 1953, after reviewing some remarks of Mr. England, an editorialist goes on in this language:

> After tracing the outstanding factors in the growth of the electric industry and the contributions of technical men, Mr. England concludes that a new type of leader is needed for the future. He said, "As the scope of his operations broadens, as the welter of technical and specialized considerations and problems becomes more numerous and complex, the management man must never forget his relationship to the people of his organization, his community, his nation, and its way of life."
>
> This broader responsibility requires unusual qualities of leadership, according to Mr. England. He says, "the most important consideration in the selection of a top management man is character. He will demonstrate conscientious determination and capability in carrying out company, community, or national responsibilities. It will be instinctive with him to choose the honorable course, whether a given situation is difficult or not. He will have a full and human comprehension of the significance of each part of his organization's operation to its over-all contribution."

It would be difficult indeed to find a better statement of the quality of leadership needed, not only in the electric industry, but in all industries.

Let me give a specific illustration of what I consider squalid and damaging cases of where the leadership of private enterprise has not chosen, in the words of Mr. England, and most honorable course. I am glad to say that such illustrations as I shall refer to are practically nonexistent now in the utility field, but whether that fact is due to the commendable restraint of its leadership or fear of regulatory powers might be argued by some.

My chief efforts for the past four years have been in the field of education. I feel very keenly about the private-enterprise system. Yet when I read of the chief executives in our well-known national and international industrial companies taking salaries and bonuses running between $500,000 and $1,000,000 a year, then, conservative as I am, I see red. When you realize how little of that salary goes to the individual under our present tax system, it seems to me a clear case of economic exploitation. Both the shareholders of the company and the customers have every right to complain under a system whereby, in order to give a man a few cents on a dollar, they pay a salary and bonus running to $500,000 or $1,000,000. And if, conservative as I am, I see red at the disclosure of such information, what can I expect from my students?

### Leadership for Banishment

So, even though these evils are rare, or non-existent in the electrical industry—or at least the utility industry—I think those of us who want to preserve the private-enterprise system should exercise leadership as shareholders and managers and taxpayers to see that this abuse of economic power is banished in all private industry. Let us fight for Mr. England's philosophy, for the honorable course in all industry as well as in our own field.

Now, lest I leave the impression that I am picking on private industry by using the illustration of excessive salaries with unjustifiable return, let me complain about one other type of dishonorable leadership.

This is in the field of government —although through private industry. That is, the unscrupulous commentators who build up a following on a personal gossip basis by means of blackmail whereby senators and congressmen—sometimes private individuals—in possession of confidential information gained at secret hearings or conferences are advised that if they will leak to these commentators, the commentators will respond by patting them on the back and building them up in the eyes of their constituents. Unfortunately, because human nature is such that people like gossip, we have several such commentators with perfectly tremendous followings, much of

whose information comes from a blackmail processs similar to what I have just outlined.

It is a sad thing indeed and has a bad influence upon the political thinking of the United States of America, because there is retaliation if the victims do not respond to the suggestion of giving inside information. They immediately become targets subject to the abuse of these commentators. There are other kinds of commentators who do not stoop to the backyard gossip type of comment but deal with issues and, whether you agree with them or not, try to put forward what the issues are and the arguments for and against, and not deal with personalities.

Now, as an educator and because I believe education is everyone's business, the same as politics is everyone's business, let me urge the leaders of the electric industry to use their leadership in the field of education. I refer to both public and private education—that is, the public schools and our institutions of higher learning. "As a man thinketh, so is he!" There is great necessity for those of us who want to know what our youth is learning to take a more active interest in and to give more active support to our schools and our educational system.

There has grown up a very large group of people in the educational field who believe that because they are specialists in education they should be accountable to no one, and that any inquiry into what is being taught is to be regarded as a punitive investigation and an interference with academic freedom. A brilliant young man, William F. Buckley, Jr., created a great furor a year or two ago when he wrote and published a book called *God and Man at Yale*. Despite the ridicule heaped upon him as a pipsqueak by academicians, his book became a best-seller. I would commend his book to all who want a picture of some things that are going on in our American colleges. Although no doubt presented from a very personal point of view, what he writes about pertains to many American colleges, and his title might well have been *God and Men at College*.

I would even concede that it is a one-sided presentation possibly, but he makes two very sound points which badly needed to be made. The first point is that our colleges were originally founded, in most instances, upon a firm belief in God and to train ministers. With the passing of years our colleges threw off shackles imposed upon their intellectual liberalism but, unfortunately, because religion became so controversial, many American colleges now leave the graduating student bankrupt of any religious convictions and almost with a scorn for religion. What a sad commentary it is today that probably in most American colleges far fewer seniors attend chapel services or church services on Sunday than do freshmen. That tells the whole story.

The second point in Mr. Buckley's book was that the overwhelming number of graduates of our colleges strongly believe in the private-enterprise system, and yet they give money each year to colleges who foster, through some of their teaching staff, the destruction of the private-enterprise system. Mr. Buckley contends that those who provide the funds should have some knowledge of, and some say in control over, what their youngsters are taught, whereas the academic profession—or at least a very voluble core of the profession—insists that any such attempt is curtailment of freedom of teaching.

Personally, I know of no Americans who have a life job without being responsible for their actions to somebody else — other than the judges of our highest courts. I do not believe our citizenry should hesitate to make the teaching profession responsible for what it teaches, any more than our citizenry should hesitate to make the medical or the legal profession or the utility industry account for what they do or what they practice. It is always good to have people in each and every branch or walk of life responsible to someone other than themselves. And so I hope that the brains of the electric industry will take time and take an interest in what is being taught to our youth in both our public schools and universities.

And lest anyone come to the conclusion that I may be bearing down too hard on some points in the academic profession that I do not entirely agree with, I would particularly like to point out how humiliating it is on my college campus today to find seniors in engineering school graduating and, if they are willing to leave the country and take difficult foreign assignments, receiving more pay on the day they step off the campus than the professors who have been teaching them and who have devoted their lives to the engineering profession. That is a tragic and humiliating state of affairs—the rectification of that situation deserves the support of all industry.

I cannot refrain from adding just one word on the Congressional investigations which have been going on and which have received so much publicity. This is due to a very limited number of professors refusing to state whether they are or are not communists, or have or have not been communists. I want to doff my hat publicly, so to speak, and I have already done it privately, to Rutgers University for seizing upon that issue, for reaching a decision that people on the staff who refuse to answer that question would not be retained by Rutgers, and for publicly explaining why they would not be, drawing a very sound line between the right of Congress to investigate what was going on in our public institutions of learning and the right to say what should or should not be done in these colleges. I believe that Rutgers made one of the soundest decisions, made one of the finest statements on this very controversial issue that I have seen. I wrote President L. W. Jones and the trustees on that, expressing also my firm conviction that our trustees, had the situation arisen on our campus, would have taken the same attitude.

In conclusion, I should like to point out that the electric industry learned some bitter lessons the hard way, but that today it is definitely out of the dog house, has done a marvellous job since the close of the war, and in doing so has won the full confidence of the public. In the new economic and political clime in which it has so recently found itself, I hope and believe that the leadership of the electric industry will live up to both its responsibilities and opportunities so effectively and efficiently that it will become the brightest star in the firmament of private enterprise.

# How It's Being Done

**Ashton B. Collins**
*Reddy Kilowatt Service*

An abstract of an address before the Twenty-First Annual Convention of the Edison Electric Institute, Atlantic City, N. J., June 3, 1953

MY subject, "How It's Being Done," contemplates a report on various activities of individual electric companies and the latest trends in electric industry advertising, public relations and sales promotion.

There is an adage that the dog that trots around a lot always finds a bone. Trotting around the country as I do, some 75,000 miles per year, I naturally find many bones, and I would now like to share some of them. I shall do this rather briefly.

Sometimes it is helpful to take a quick look at the past and profit thereby. A look at American business history, for our purposes, could start with the Gay Nineties, when all American business was comparatively small and hardly needed any advertising or explaining. Business leaders were able to work hand in glove with their employees and neighbors. They talked over the back fence. They understood each other and the free-enterprise system.

### Public Understanding Outgrown

But, the rapid expansion of American business in the following decades changed all this, and most industries outgrew public understanding. The depression of the early 30's followed, bringing in its train political, economic, and social experiments that bore heavily and unfavorably on the American Economic System for a period of some 20 years.

The resultant damage to all business was bad enough but probably more devastating to the electric industry than to any other. That the electric industry survived it is a tribute to the many courageous leaders who fought rear guard actions and kept the industry intact until American constitutional government could be restored. That happened last fall, and perhaps now we would be justified in feeling somewhat like those famous lines in Shakespeare's *King Richard III:*

ASHTON B. COLLINS

Now is the Winter of our discontent
Made glorious summer by this son of York.
And all the clouds that lour'd upon our House,
In the deep Bosom of the Ocean buried.

But, lest we allow this feeling of release to run away with us, we might well take heed of a recent statement by our good friend Bill Price, of Westinghouse, which pointed out that businessmen had been complaining for 20 years. "Now let's see you do it better," he said. "And God help you if you don't."

My contacts with utility businessmen convince me that they will indeed do it better, especially as the shackles are removed. The courageous efforts of these men in the past 20 years at the grass roots forged bonds of great strength and formed a veritable army for free enterprise . . . for all business. They learned the hard way, in the thick of battle.

It was in those past 20 years that advertising and public relations in the electric industry began to grow up. Prior to that, public relations as a program was not widely practiced by electric companies, and advertising as a plan was almost in the same category. The electric industry in its early years needed little advertising, for it was spectacular enough to attract the public automatically. It was not until the 1920's that its novelty aspects wore off and the public began taking it for granted, creating the need for more informative advertising.

Then along came the promotion of hydroelectricity, and customers clamored for something that sounded miraculous and almost free. "Cheap hydroelectricity" became a catch phrase in the 20's, somewhat like "atomic energy" is becoming today, and unless we control the latter phrase in time, it can mislead the public into expecting atomic electricity to be as free as air itself.

### Reservoir of Useful Material

In recent years, advertising, public relations, and sales promotion have grown greatly. No longer are they being left to emergency or day to day methods. Much credit for that goes to the Public Utility Advertising Association, a strong group of several hundred keen and creative people with a basic knowledge of the utility business and with an interchange relationship with each other that subordinates pride of authorship to the common good, pouring the best ideas into a reservoir of useful material.

I emphasize that interchange because, while advertising and public relations are local to each individual company, they should make for a common cause across the country.

Frequently, I am asked "which Company is doing the best all-around job of advertising and public relations?" The answer has to be that no one company has a corner on all the best ideas. True, some companies do more than others, but I can answer that there are so many companies now promoting in balanced fashion that it would be beside the point to name one company.

However, some new and significant trends have been taking place in the advertising and public relations activ-

ities of our industry in the last few years.

One of the most far-reaching has been the long-range promotion by individual companies of community and regional programs for the betterment of the areas they serve. Such programs are soundly in the public interest and have achieved outstanding success in many territories. They have resulted in wide-spread civic betterment and, in one case, in the transformation of a winter vacationland to an all-year-round playland and business area for the benefit of an entire state.

There is a strong feeling on the part of some executives that community and area programs are the most significant public relations developments in the industry since World War II. These programs do indeed present an exciting challenge.

Some electric companies are actively and successfully promoting industrial development, while groups of other companies are cooperating on a statewide basis to promote rural electrification. However, there are many other facets to the public services provided by electric companies, among which might be listed motion picture films and staffs of lecturers for schools, plant tours for school children and the public in general, children's booklets on safety and the making of electricity, and talent shows for young people.

Another rather fundamental development in the industry is the trend toward humanization and simplification of the lowly post-card bill by interpreting the kilowatthours and amount columns as servant hours and wages. In the field of sales, some companies actually act as the hub of the promotional wheel for dealers, concentrating their sales and advertising promotion in behalf of the dealers.

Television is another development becoming increasingly important in electric company promotions, and a number of companies not only sponsor running spot commercials but also 15- and 30-minute programs. While television has its place, however, we must remember that newspaper advertising is the cornerstone of all utility promotion.

All business is local. The newspaper is local. The utility business is local to the community it serves. The newspaper deals with all people daily and weekly, recording births and deaths, accidents, social events, civic affairs, etc., many things in which a local electric company plays an important part.

Thus, every electric company advertising man is alive to his local newspaper as the number one medium of communication.

The programs and activities I have described are but a handful of the scores that are being used in many different parts of the country. Space does not permit my describing more, and I shall probably be embarrassed by the many that I have omitted or overlooked.

But, they do demonstrate one thing. It is this: the life of the power company is inseparably linked with the life of the community. That most companies are alive to this fact is surely indicated by the examples and trends I have mentioned.

Community and area programs, plus industrial development, business education days, coordinated dealer sales programs, state and regional promotions, and youth activities are building up across the country at the grass roots, like—

Little Drops of Water and Little
Grains of Sand,
Make the Mighty Ocean and the
Mighty Land.

Advertising and Public Relations and Sales Promotion are being stepped up measurably. Advertising is like a kiss . . . what you get out of it depends on how much you put into it. The industry is spending, on the average, only .6 of one per cent of gross revenues on advertising promotion. That is not enough. Some electric companies are already doubling this, but commercial concerns frequently spend up to 5 or 6 per cent of gross sales. A girl with a pretty knee can just grin and bare it, but we have to spend money to put our story across.

With today's fast moving tempo, our promotion must move faster. The competition is keener, but the tools are better than ever. We now face the greatest opportunity in our history, with expanding capacity of power plants and manufacturing plants and a freer atmosphere in which to operate.

Now that electricity has become a family affair we must broaden our whole program along a wider front to encompass all members of the family. We have a big selling job to do. And we really have something to sell.

The question I was to answer is, "Are all the horses on the team pulling together?" And the question does not embarrass me today nearly as much as it might have just several years ago. The answer is definitely, yes, there is better teamwork than ever.

But, now that the sun has come from behind those 20 years of clouds, it behooves us to step up our advertising and public relations and sales promotion above our rated capacity and up to full capability. In the beginning I pointed out that our industry outgrew public understanding and that our enemies for 20 years capitalized upon it.

And I submit that we cannot take 20 years to undo what 20 years did to us. We had better try to do it in four years!

## Fremont L. Lovett

FREMONT L. LOVETT, President of Rockland Light and Power Co. in New York, Rockland Electric Co. in New Jersey, and Pike County Light and Power Co. in Pennsylvania, was killed recently when his private plane which he was piloting crashed in Vermont. He was 64 years old.

A native of Vermont, Mr. Lovett was graduated from Norwich University, then began his electric utility career as an electrical engineer with the Worcester (Mass.) Light and Power Co. Subsequently he was employed by the Brockton (Mass.) Gas Light Co.. of which he later became a director.

He became general manager of the electric companies in Rockland and Orange Counties, N. Y., in 1927, and nine years later was elevated to the positions of vice president and director of the Rockland Light and Power Co. For the past year, he held the position of president of the latter company as well as of the New Jersey and Pennsylvania companies.

A civic leader in New York's South Hudson Valley area, he was president of the Nyack Chamber of Commerce and head of the Rockland County Council, Boy Scouts of America.

# Building Profitable Load

**J. R. Hartman**

*Vice President, The Cincinnati Gas & Electric Company*, and
*Chairman, EEI Commercial Division General Committee*

An address before the Twenty-First Annual Convention of the Edison Electric Institute, Atlantic City, N. J., June 3, 1953

DURING the first 50 years of our industry, the increased use of our service permitted a long series of rate reductions. It appeared that the utility industry was in the fortunate position of being able to offset the effect of inflation by increased sales. Following World War II, however, the inflation was so rapid that we found it necessary to seek rate increases. Sales presented no problem because the prosperity resulting from a pent-up demand for durable goods increased our output at a rate faster than we could provide generating equipment and it was necessary for us to draw on our reserve capacity which, by the end of the war, had reached 27 per cent.

Before we were able to bring reserve capacity up to normal, hostilities broke out in Korea. The demand for energy rose sharply, and material shortages slowed down the installation of generating equipment. The time is rapidly approaching when we will again have adequate reserve capacity. This reserve capacity will have been installed at a unit cost well above the system average, and further rate increases may be required to offset further inflation and to provide a return on this increased investment.

Rate increases which have been granted in the past have been well accepted by our customers because they were in phase with the inflationary trend. The inflation which has been going on for so many years now appears to be checked temporarily, and we can anticipate a much less favorable reaction to future rate increases.

As we expand our systems and replace units of generation or distribution with new ones at a higher cost, the system investment per unit of capacity will rise. It is our responsibility to analyze the situation most carefully to determine what steps can be taken to increase the return on the investment before resorting to further rate increases. Certain economies can be effected by revising our practices in all departments to be sure that all operations are being conducted in the most efficient manner in view of our increased output. Much has already been done along these lines, and it is not my purpose to discuss this phase of the question.

J. R. HARTMAN

The developments which have taken place tend to increase those cost factors which are influenced by kilowatthour output much less than those which are influenced by kilowatt demand. In most cases, the incremental additional investment in distribution system to serve desirable new loads from existing lines is relatively low as compared to the average distribution investment. The incremental distribution and transmission operating cost is also low. Increased sales of energy for such uses that do not adversely affect the system load factor appreciably will produce increased net earnings and an increased return on the investment.

An aggressive sales program accomplishes many things—

1. Increases gross and net revenues.
2. Postpones or avoids the necessity for rate increases.
3. Provides a healthy growth factor which attracts the necessary additional investment.
4. Improves public relations.

It is possible that too little attention has been given to this last effect of an aggressive sales program, namely, improvement of public relations. We are indeed fortunate to be in an industry the use of whose product produces such widespread satisfaction. The customer who buys a dishwasher, a dryer, or an air conditioner receives such benefits that a kindly feeling toward the company which supplies the energy is most natural. Then, too, as we carry on an aggressive sales program to encourage the use of appliances, we resell existing owners of these appliances on the many benefits which they receive from them.

The only situation in which increased use of our service does not tend to improve customer good will is that in which an inadequate job has been done. If a store owner relights but installs only half as much light as he should or installs air conditioning equipment of inadequate size, dissatisfaction may follow increased use of energy. This type of situation, however, is also corrected through an active sales program. During the past 12 years, salesmen and sales managers have tended to become lax in their methods. Much attention is now being given to this matter and within a relatively short time a hard-hitting team will be back in the field.

There is another phase of this problem which deserves serious consideration. During the period following the start of World War II, some sales budgets were cut. Others increased but did not increase as fast as the growth of revenue so that there has been a general decline in

the sales expense per dollar of gross revenue.

Every effort should be put forth to increase sales efficiency by a study of methods used effectively in other industries. Methods which were effective prior to World War II may be found far too costly under present conditions. In many cases mass selling in one form or another will produce more revenue per dollar of sales expense.

The opportunities which lie before us in this great industry are so tremendous that we will not make the most of them if we allow sales expense, expressed in terms of gross revenue, to remain at the present low figure. The competition from other industries in the field of cooking, water heating, and clothes drying is keener than at any other time in our history. Even more important is the other competition for the customer's dollar. Other industries have learned the value of advertising and find that mass production makes it possible for them to spend a larger and larger proportion of their revenue in sales effort and at the same time reduce the real cost of the product to the consumer.

This, then, is the first phase of building profitable load.

### Sales Budgets

I suggest that we analyze our financial reports for 1952. We probably will find a substantial increase in gross revenue but a relatively small increase in net earnings. To determine the effect of increased sales, deduct from the figures the revenue from increased sales and the expenses which would not have been incurred if these sales had not been made. In the analysis of our sales expense we will find that much of what has been charged to sales could not be eliminated even if no sales activity were carried on. The proportion of such expenditures will vary with each company. We will then be able to determine what the earnings would have been if there had been no increased sales and no sales expense. We will find that there would have been a substantial decline in net earnings.

With this information it is a simple matter to study the effect of an increase of 25 or 50 per cent in the increased sales. It will give us a better guide as to the amount that we can profitably afford to put into our sales budget.

One peculiar aspect of our business is that in order for us to have a market for our product, electric service, we or some of our allies in the industry must sell some appliance or equipment which uses electrical energy for its operation. Regardless of whether a company engages in the merchandising of appliances or not, the major function of its sales effort is to create a demand for an appliance.

The first cost of many electrical appliances is high and since there is a definite limit as to the investment which our customers can make in electrical appliances each year, it is incumbent upon the sales manager of a utility to make a study of the retail cost of various appliances and the electric revenue which will result from the use of the appliance. In making this study, consideration must be given to percentage of sales that will replace older models of the same appliance.

By way of illustration, I would like to submit the following figures on a few appliances:

| Appliance | Per Cent New Load | Annual Kwhr | Retail Price | Additional Annual Revenue | Cost/ Revenue |
|---|---|---|---|---|---|
| Range | 90 | 1100 | $316.00 | $19.80 | 16.0 |
| Water Heater | 100 | 3600 | 150.00 | 36.00 | 4.2 |
| Ironer | 100 | 155 | 204.00 | 3.10 | 66.0 |
| Automatic Washer | 100 | 50* | 285.00 | 1.00 | 285.0 |
| Conventional Washer | 20 | 25 | 153.00 | .10 | 1530.0 |
| Electric Blanket | 100 | 130 | 41.00 | 2.60 | 15.7 |

* In addition to conventional washer replaced.

The above values are approximate only, and electric revenues have been calculated at two cents per kwhr for all appliances except water heaters, which have been calculated at one cent per kwhr. The calculations made on the above basis will vary widely, dependent upon many local variables.

A similar study on lighting produces very interesting results. If we can induce a commercial customer to replace a 100-watt bulb with a 300-watt bulb, the customer's increased investment is 66 cents, whereas the gross revenue to the utility based upon 2500 hours per year and two cents per kwhr is $10. An analysis of this type will enable us to give more intelligent direction to our sales effort. In many companies, we are neglecting lighting, our original market, for some of the newer and more glamorous applications.

With a limited budget, we can direct greater emphasis to the promotion of those appliances which have a higher ratio of revenue to original cost. This information is also useful in discussions with manufacturers, distributors, and dealers to get their assistance in broadening the market for those appliances which have a low ratio of revenue to first cost.

I firmly believe that if the electrical industry is to approach its full potential in the next few years, manufacturers, distributors, and dealers must do more at the local level to increase public acceptance of the new appliances. An adequate job cannot be done within the sales budget of the operating company.

This study and the action which results from it constitutes the second phase of building profitable load.

### Daily Load Curves

We have considered the trend toward higher investment and fixed costs and toward relatively lower variable costs in the production of electrical energy. This trend causes load factor and its improvement to become one of the major responsibilities of a sales manager.

I have followed the practice, for many years, of having the draftsmen, in their spare time, cut out cardboard profiles of the daily load curves. These daily load profiles are then assembled in such a manner as to produce what might be termed a three-dimensional load curve. These models are kept where they are readily accessible and are consulted very frequently in planning a sales program or in appraising the results of past sales programs.

In the improvement of load factor we have two types of load factor to consider. There is the load factor of the particular feeder which influ-

ences the investment in distribution facilities and the load factor of the system which influences the cost of generating facilities. Any load building program which tends to improve either load factor will have a beneficial effect on net earnings and any new load which tends to improve both load factors will be most profitable.

If all electric systems had the same type of load curve the solution would be relatively simple. A committee of EEI could study the problem and recommend a program of load promotion that would improve the load factor of each member company. A few of the factors which influence the shape of the load curve are:

1. Proportion and type of industrial load.
2. Rural and metropolitan characteristics.
3. Variation between seasons of the year.
4. Relation of time in use in area as compared to sun time.
5. Relative saturation of various types of appliances.
6. Special inducement rates favoring some time of day or season of the year.

The shape of the daily load curve varies throughout the year but the shape of this curve at time of the annual peak is most important. The annual load curve taken at time of peak is important, but a study of annual load for various hours of the day will be helpful.

One way of improving load factor is to design a rate which encourages additional load at some period of the day or some season of the year. This method should be approached with caution because the load curve is constantly changing.

A number of years ago our own company found that there was a definite summer valley in the load curve. At the same time there was a hesitancy among the owners of large stores to install air conditioning equipment because of the high operating cost. A special summer off-peak rate was effective in building summer load but the growth in refrigerator saturation and general acceptance of air conditioning have increased the summer peak to a point just below the winter peak. Some modifications have been made in this rate but it has not been possible to correct the situation in its entirety because of large increases many customers would incur.

Concessions to build night load appear to be reasonably safe but seasonal concessions are always dangerous. The report which EEI has issued on resistance house heating stresses this point and urges the member companies to adopt rates which will be compensatory under all conditions.

The sales manager has the opportunity, and therefore the responsibility, to influence load factor by a study of the daily and seasonal load curves of his own company with respect to both system and typical distribution feeder. An examination of these load curves will indicate those periods of the day or year in which load can be added without increasing distribution system peak or system peak or without increasing either.

Some of the conclusions which may be drawn from such a study are relatively obvious. For example, the company serving an industrial area with a morning peak will find that residential lighting is an off-peak load in so far as system is concerned. In such cases, the promotion of home lighting should take on a new importance because profitable lighting load can be added without increasing the peak.

The advent of fluorescent lighting provided a great opportunity for companies, the importance of which has not been fully recognized in all circles. Older types of lighting provided a relatively low intensity. As a result the customer turned the lights on only when daylight failed either because of nightfall or because of a storm. As a result we had the lighting demand but sold relatively few kilowatthours. If fluorescent lighting is used to replace incandescent equipment on a fixture per fixture basis or even to produce only double the intensity, the use of lighting remains unchanged. However, when fluorescent lighting is installed to provide an intensity of 60 foot-candles or more, the lighting is in use whenever the space is occupied. Thus commercial, industrial, kitchen, and laundry lighting should not be evaluated upon the basis of connected load but rather upon the sale of additional kilowatthours, improved load factor, and customer satisfaction.

A few appliances such as clocks operate at inherently high load factor. Other appliances such as electric bed coverings or attic fans by their very nature operate off-peak and will improve the load factor of any system. Other appliances have their own load characteristics and vary widely one from another. The sales manager who is equipped with a knowledge of the shape of the load curve of various appliances and has made a study of his company's daily and annual load curve can determine in advance the effect of any individual appliance on the load factor of a distribution feeder and of the system. He can also determine in advance the increment investment in distribution and generating capacity that will be required to serve that appliance. With this information at his disposal, it is a simple matter to determine the net revenue from the appliance and the return on the increment investment.

Relatively little information has been available on the load characteristics of various appliances and it appeared desirable to assemble the information which has been collected over the years and include it in an appendix which is available upon request from the Edison Electric Institute, 420 Lexington Avenue, New York 17, N. Y.

This appendix has been entitled "Sales Manager's Rough Guide to Residential Load Characteristics." The word "Rough" has been included because it is not intended that the information contained in the appendix is complete nor that future research on the subject may not alter the data presented to some extent. The guide does not cover all appliances and the information on some of the newer appliances is somewhat less reliable than that on others because a fewer number of studies were available from which to draw a conclusion. Until a complete study is available, the data contained in the appendix should be of substantial assistance to those sales managers who wish to adopt this suggested technique.

If there is any question as to the wisdom of a controlled approach to this matter of load building, I would like to recount the history of a major electric system.

(*Continued on page* 294)

# Salesmanship Can Improve Public Relations

**Charles E. Oakes**
*President, Pennsylvania Power & Light Company*

An address before the Twenty-First Annual Convention of the Edison Electric Institute, Atlantic City, N. J., June 3, 1953

FOR the past two decades industry in general and the electric power industry in particular have existed in an unfavorable political climate —unreasonably restrained in their proper and lawful functions, unfairly hampered in the exercise of managerial judgment, unduly subjected to restrictions of economic incentive and initiative.

To a degree, American industry during these years has experienced the same kind of paralyzing influence of control by a dominant state that in the history of so many other peoples of the world has sapped their economic vitality and has consumed their ability to progress. In such an unhealthy environment, other nations have not been able to muster the strength required to develop the vigor and leadership so much needed in the world today. While we have been subjected to these same forces of attrition, we have thus far been able to ward off substantial damaging effects to our economy.

### Need for Change Freely Expressed

It is fortunate indeed that we live in a country where the need for change of the economic and social climate of our government may be freely expressed and accomplished by orderly lawful processes. Inherent and inseparable in the process is the great responsibility which falls on every individual to uphold and advance our traditional principles. In retrospect we have seen the soundness of these beliefs attacked and seriously undermined by many who played upon our failure to meet our obligations.

But an encouraging change seems to be taking place. There is growing evidence that more people recognize their responsibility and are again accepting an important basic idea which William Ellery Channing expressed as, "The office of government is not to confer happiness but to give men opportunity to work out happiness for themselves." Thus, within the past few months, the American people would seem to have taken the initial steps in the needed transition toward a government more impartial, intelligent, and understanding in its treatment of its citizens, individually as well as collectively.

CHARLES E. OAKES

Today we look forward to an era of good government, of integrity and fairness. In the American tradition of fair play, we, along with industry in general, ask only for fair treatment —no special privilege—no preferential advantage. But to my mind, if we are to expect such reasonable treatment, industry itself must display a spirit of constructive support toward government and must evidence a generousness of mind toward those sincere public officials—and there are many of them in both parties—who are deserving of respect and our wholehearted cooperation. Only by such joint efforts can that unity of purpose be achieved and the heavy burden of world leadership that has been placed upon our national shoulders be borne successfully.

What can we as a responsible industry and as responsible individuals do? We know that the enemies of the free world hope vainly for our productive strength to weaken and collapse, opening the way for the establishment of a new order. But industry has responded to this challenge and has expanded productive capacity and output in unprecedented proportions. Our industrial leadership has met the double strain of building up the defense establishment and maintaining, even advancing, the civilian economy. Taking care of our physical needs is important, of course, and I am fully confident that industry will continue to do so.

But there is another factor which threatens us, perhaps more serious because less tangible and less understood. In the final analysis it is what people believe that controls the kind of world we have and the kind of country we live in, and it seems to me that it is this matter of people's beliefs that is our number one problem.

Though we have been successful in solving the problem of production, we have not done as well with this one of beliefs. It is of primary importance in this area of ideas that the public be made more conscious of the nature of economic forces and the individual's importance in their creation. On top of this is the fact that the consequences of this lack of public comprehension in the political and economic unrest of recent years have become much more serious.

### An Idea Whose Time Has Come

What to do about it? No one, in my opinion, is in a better position to do this job than American industry and no one part of industry quite as well as our electric industry.

It was Victor Hugo who said, "Greater than the power of armies is an idea whose time has come." I think the time is propitious and that a nationwide ground swell of awareness is developing from the actions of thousands of citizens in communities throughout the country. As responsible citizens of those communities we must undertake our full share of these activities, and we must enlist the support of others. I believe that such actions, properly conceived at the community level, supporting and sustaining each other in many directions,

may well produce a much-needed strengthening of the social and economic fabric of the nation.

It seems to me that we cannot find adequate answers to these problems by the adoption of any over-all plans. For one of the great difficulties is that no such national program can ever be productive of a sufficiently articulate force. But the individual through his community can become expressive. So we come down to this—that it is what the individual thinks and what the community does that is important.

This obviously calls for a local approach, a door-to-door approach, a person-to-person approach. The job must be done in the communities and with the people in them on this basis. Of course, many of our problems looked at in this way involve local solutions, but in the aggregate the answers we get may well have national implications.

### Ever-Widening Frontiers

In the electric industry we have long been accustomed to the constant challenge of ever-widening frontiers in our business and they are still opening before us. But here we face a new and exciting frontier—the frontier of human relations and understanding—a frontier perhaps not as clearly defined nor as carefully charted as others, yet just as real and certainly filled with opportunity. More and more we are beginning to realize that a business is not a wholly material thing. It primarily involves human beings and human relationships, and this is particularly true of the electric industry in which the idea of service to the people is paramount.

The electric companies should take the lead in this great informative task, for probably in no other business does the American industrial system that we call free enterprise, for want of a better term, become more self-expressive. The property of the company has been built solely to serve the customer. It is there, right where he and his neighbors can see it. And the employees who do the work are those he sees and knows personally in many cases. The company itself and its employees buy many of their needs from his firm, and he sees the money he pays for service in turn flowing back to him. Furthermore, in many cases, as a share owner, he receives a return on his invested savings—savings used to provide his and others' service. But generally he does not see this clearly until it is pointed out and as he does, the economic system, the profit system, the private property system which is the backbone of America become less puzzling.

The founders saw very clearly the importance of protecting the rights of the people to own property as basic to liberty. In recent years, however, this and other fundamental ideas have become obscured and today there is a great need to restore them to their rightful place. Words in themselves, however convincing they may be, are not the answer. The words need to be interpreted by countless specific acts.

And it seems to me that we in the electric industry are peculiarly equipped to undertake at the local level this essential task of demonstration and improvement in public understanding. I say this because we have in our companies highly trained sales people engaged in meeting vast numbers of the public every day and in whom the public has confidence and respect. True, we look to them as load builders and revenue producers, but unless we realize that "salesmanship can improve public relations," we are not realizing their full potential constructiveness. We should all make greater use of their abilities by more forcefully directing their attention toward improving public good will as well as toward bringing about a better public understanding of our American system.

Just a few years ago a number of companies saw the necessity to embark on a broad program of reestablishing their relations with customer, community, employee, and share owner and some took the opportunity to emphasize the interest of everyone in holding to solid American principles.

What were the problems so many of us faced? At the outset it was apparent that the responsibilties and arduous tasks thrust on everyone over the war years had made it difficult to maintain successfully those personal relationships so essential to proper understanding of industry's activities and objectives and of the benefits accruing to all of a healthy business state.

More particularly, wartime equipment and manpower shortages had brought about fewer and fewer opportunities to meet and talk to customers. Restrictions in the use and the rationing of materials had forced a lowering of service standards and of the readiness with which the customers' needs could be met. Availability and adequacy of service in the community had become a matter of first importance in the expansion plans of local industries and in the location of new concerns. Many employees had lost, over the war years, their sensitivity to the importance of the customers' interests as well as proper appreciation of the vital role each played in the furnishing of an essential public service. In many cases these problems were compounded by the imposition of severe financial problems resulting from divestment from a parent company under the Holding Company Act.

The situation seemed clearly to call for the cultivation of human contacts on a broad scale. I should say that industry-wide a great good was accomplished in a short time. Yet, while the electric industry's extensive efforts pitched on a national basis proved productive, they served to accentuate the overreaching importance of bringing our story into the home in intimate fashion.

What was done, how it was done, and why it was done are questions whose answers are just as vital today as they were yesterday. The story we have been telling is not one which can be told at a single sitting. It is one which needs to be told many times and retold by thousands of people. And the story will have to be phrased and rephrased as day follows day, for while in detail it may concern our electric industry, its theme is the close bond which ties our growth as a nation with our industrial progress.

### Improving Public Relations

Thus, it may be profitable to look at some of the things that have been done to raise the level of public understanding and relations by the use of this principle of working at local levels. I know my own company best, and perhaps some of the things we have done may be of interest.

Right after the war we started a program designed to reach on an individual basis each employee and as many as possible of the opinion-forming leaders throughout our 9500-square-mile service area. This initial effort took over five months of on-the-job group meetings by our top people to reach each of our 6500 employees. Along with this, our sales people arranged a heavy schedule of appearances before business and civic clubs. Informal sessions were held with the

local press and, in company with our commercial sales people, with influential industrial, business, and civic leaders, to establish an intimate feeling of mutual interest.

Throughout these meetings, emphasis was laid on the close interdependence between community and company, stressing the benefits of home-town ownership and management and accenting the vital responsibility of each employee in the company's business.

By these intensive efforts channels of information were reopened. It re-established the company as an important economic factor in the community. It made clear the need for and the volume of our construction program. It aroused interest in the financial program of the company.

### Good Neighbor Approach

This good neighbor approach became the theme for a series of advertisements. Aimed at emphasizing the local character and the mutuality of interest of company and community, these advertisements featured and pictured a well-known employee living within the circulation area of more than 100 local newspapers. Nearly one out of every six employees—over 1,000 of them—were thus shown, together with their personalized remarks and brief biographical sketches. Text stressed the importance of their job in serving the public and advantages of employment with the company. By humanizing the company's operations and employees in this fashion, large numbers of the customer-public became acquainted with company affairs and its people, at the same time impressing on the employee and his friends the importance of his work.

In a later series of these home-town ads, the same personalized technique was used to portray the role the investor plays in the development and expansion of the company and American industry. In these, significant facts about security owners as disclosed by stockholder surveys were emphasized. The initial ads pointed out the benefits to the public from the company's construction program, with particular attention on how the stockholder makes financially possible the construction and expansion of facilities to take care of the public's electric needs. The ads also showed how even the individual of modest income who had saved and invested in the securities of industry was making an important contribution to industrial progress. To humanize these ads the sales people visited hundreds of stockholder - customers and secured photographs of over 700 individual customer and employee stockholders. As had been done in the early series on employees, each advertisement featured people living in the circulation range of the more than 100 newspapers in the service area.

The readiness of this large number of stockholders to agree to the use of their pictures publicly and the statements made offer striking evidence of the value of using the sales organization on such projects as well as the stockholders' general willingness to take constructive action on behalf of a company in which they have invested. These investor owners can be vocal. Ways should be found to enable these millions of holders of electric company securities to be a more vital and expressive force.

The report of The Brookings Institution on "Share Ownership in the United States" points out the importance of broad ownership by the public of the securities of industry in achieving economic stability, in strengthening the private enterprise system, and in improving individual understanding of how our economy operates. The electric industry may take credit for an effective educational program toward this end. According to the Brookings report, more share owners who hold only a single issue have selected public utilities as their initial investment than any other industrial group. And when it comes to the extent of employees' ownership of stock in companies by which they are employed, public utilities again are at the top of the list with 15.9 per cent of employees as security owners of their companies against only 8.9 per cent of the next group.

This is indeed a creditable showing for our industry, but there is much more that can be done in broadening the ownership of our securities, and our attention should be directed toward this.

In the final analysis, solutions to many of our industry's problems ultimately require action by state regulatory bodies. Some companies have found it desirable to hold periodic informal conferences with commission members and their staffs to discuss the broad economics of our business. Meeting the commission people face-to-face, without the tensions present in formal proceedings, will result in their having a satisfactory understanding of the economic and financing problems of the industry.

The customary appearances most companies make before security analysts and others offer not only the chance to inform this group of financial people but local groups as well. Such meetings in metropolitan centers followed by presentations to the security dealers, banking and financial interests in the service area, allow these local people to get personally the same story that is given the metropolitan analysts. In this way these local people have the opportunity to question and discuss company affairs directly and coincidentally without having to rely on prepared analyses by metropolitan specialists. These local investment and banking leaders welcome this recognition and they are expressive of their appreciation of the consideration shown them. The last time we did this, over 80 per cent of those who were invited attended these meetings and they told us that they met more people from their own group at these company affairs than they did at meetings of their own business organization. These presentations of the company story have been followed with complete text in printed form for each group member. Generally, these brochures are personally delivered by our commercial people, affording a further chance for intimate conversation about the business and its prospects.

### Proxy Solicitations

Proxy solicitations afford another excellent opportunity to meet large numbers of stockholders face to face. In these proxy solicitation efforts, preferred stockholders should be considered in the same category as common stockholders. They are all equity owners, even though their investing motivations and interests may be somewhat different. As direct owners of our business, preferred stockholders are as valuable and important allies as common stockholders. Wherever there is large local ownership, the commercial organization can carry the bulk of this solicitation work. Wherever possible, such employees should be assigned lists of stockholders whom they usually visit as customers. Thus, better and friendlier reception results. Stockholders are appreciative of this personal interest

in helping them to a full understanding of the subjects on which their views are needed. Employees benefit, too, through becoming informed about phases of the business they ordinarily do not encounter in their usual assignments. The sales forces generally welcome such opportunities to be of real assistance to these stockholders, many of whom they know personally as friends and customers.

The ways in which salesmanship can improve public relations are almost countless. For example, in the ever-present problem of school modernization, the need for good lighting is recognized more and more as important to health and to a realization of the educational potential. At the same time, school officials are faced with budget problems which demand that the greatest care be exercised in the emphasis placed on the various functions in a school plant. This offers a fine chance to be of real assistance to these people. For those companies who are able, sponsored trips to Nela Park for school officials and architects working on school problems help them in developing better school plants and avoiding costly mistakes.

### Electric Ranges for Schools

Further, in helping the schools carry out modernization plans in spite of limited budgets, a program has been developed for furnishing new electric ranges to home economic departments at no cost to the schools. This plan, now in use by several electric companies, calls for furnishing the initial range by a cooperating manufacturer on a deferred payment basis. Then once a year, or as new models are introduced, the older model is taken out and sold. This program provides the teachers with the most modern equipment and at the same time is enabling tomorrow's homemakers to learn first-hand the advantages of electric living. From these and similar efforts comes the grateful acknowledgment by school officials of the help they are getting from the sales organization in meeting their educational responsibilities to the public.

Hospitals and similar institutions frequently encounter operational problems made particularly difficult by the fact that they are beyond the scope of their normal institutional experience. Here the electric company can be of tremendous help. For example, we have in our sales department a professional caterer, a major part of whose work is on-the-job studies in the modernization of food preparation and distribution. His services have been in high demand by such institutions.

Even more unique, a local hospital encountered recent difficulties in securing student nurses. Sales department specialists were enlisted in finding a solution. They came up with a colorful slide film which quickly placed the hospital back in the happy position of having more applicants for its nurses' college than it can presently enroll.

Local community service groups are always looking for ways of enriching their treasuries to carry on their work. With this in mind, Parent-Teacher Associations and similar organizations have been offered the use of demonstration kitchens, together with the necessary materials for turning out cakes, cookies, etc., for their bake sales. These activities have developed large groups of enthusiastic home-town rooters for their electric company as well as indirectly promoting the advantages of electrical living.

About a year ago, our company introduced our Reddy Kilowatt Farm Program, in which a farmer who has reached a high degree of electrification of his operations is awarded a citation. These citations are presented at a dinner meeting sponsored by the company in a grange hall or other place of the farmer's choice to which his friends and neighbors are invited. Also present are prominent officials in farming circles. All of these people, in addition to the farmer himself, express great appreciation for this tangible evidence of company interest in the importance of his individual achievement in agricultural progress and the recognition of its essential place in our economy.

Effective in improving industrial customer relations is our "Directory of Products." It provides business, industry, and government with answers to these questions: What is made? Who makes it? Where is it made? What basic raw materials are available, and from whom—all in Central Eastern Pennsylvania. Over 15,000 copies of this 76-page directory have been sent to American industry and government procurement agencies. This sales department publication is recognized by our industrial customers as of considerable value to them in securing new markets for their products and in finding new products for local manufacture.

Important activities fairly common to many electric companies but needing continual emphasis are those such as furnishing leadership for local communities and regions in organizing for area development activities. With our service areas embracing countless small sections, lack of professional advertising and promotional service is a deterrent to constructive action in many cases. We can help these people develop effective programs by offering the services of our advertising and publicity departments through our area development people to communities on a consulting basis where a regular agency service is not available or the "account" is considered too small by independent professionals.

### "Portrait of Power"

Salesmanship can take many diverse directions to improve public relations. Instrumental in furthering art appreciation in our service area and at the same time familiarizing many with our company is what is called the "Portrait of Power," an artistic interpretation of industry. A major art group in our service area visited our Sunbury plant and put their impressions on canvas.

Under the direction of our promotional people, the resulting art exhibit has been on tour in the various communities and colleges nearby. At each, a local art group in the community or the college has been brought into the activity by having them direct the hanging and opening of the show with a preview tea for community leaders, thereby using the exhibit to help promote local art interest and patronage. In turn, electric power operations have been effectively dramatized before a strata of society ordinarily not readily reached. With special emphasis also placed upon attendance by school-age youngsters at these various shows, not only is art interest stimulated among this younger group, but these efforts win the appreciation of the teaching fraternity.

These and many other activities can permit us to touch on the traditional concepts of society and no opportunity should be lost to do so and to stress the overreaching importance and high place of the individual in the scheme of things. Behind them runs the theme that American business is not

a deterrent to social progress nor is it in conflict with basic democratic principles.

And believing firmly that the responsibilities of business to the public call for a forthright position—a more aggressive defense of the rights of all citizens—individually and collectively, in the political and social as well as in the economic sense—we should not hesitate to be outspoken whenever, in our honest judgment, the occasion seems to demand it.

Permit me one or two illustrations.

Several years ago, it was my privilege to speak at the annual meeting of the Chamber of Commerce of the United States on the "Inroads and Effects of Federal Power Programs"—in which the drift toward socialization of the industry was factually set forth. The subject was of such importance to us as to warrant bringing it to the attention of the public in our service area. Printed copies, fully illustrated, were distributed by personal letter to the more than 12,000 opinion leaders to whom informative material is sent from time to time. Every employee received a copy and personal letter. It was made a subject for conference discussion by our supervisory staff. It was taken to the service clubs and similar groups in our communities where it was presented by a number of our sales people and others. News outlines and background material pointing up the significant issues were given to the local press covering each presentation by local personnel who received featured treatment. I cite this incident simply to show how personalized development of a single talk can be used to bring a message down to reach a very large number of people in an intimate fashion.

In another direction, just last year an employee-developed program, "The Power of Your Vote," a non-partisan illustrated talk, pointing out the many reasons why it is so vital that every good American register and exercise his right to vote, was presented to every employee through a series of meetings. A group of specially trained sales employees and others presented this program. So much favorable attention was attracted that outsiders began asking if these employees would not be willing to appear before others. As a result, employees gave these talks before civic and service clubs, church groups, Parent-Teacher Associations, and patriotic organizations. In addition, other civic groups were stimulated to action by this effort. The presentation of this program as a public service was not only well received but produced many complimentary responses.

Now, I do not wish to claim that our approach and what we have been doing is original. Many companies are reaching the public person-to-person through their sales departments. There are many notable cases where this has been done in a meritorious way and with creditable results.

The activities of our area development departments offer one of the most constructive sources, not only of building good public relations, but of reversing the unwholesome trend of the citizen looking to government to solve his problems. The existence of slum sections in many cities very obviously retards civic progress and, of course, hampers load development. One of our forward-looking companies, Union Electric of Missouri, realized this and, with other business people in St. Louis, has joined in an urban redevelopment program based on the theory that responsibility for slum clearance is a local problem. They knew that while the Federal government had a slum clearance program, any really successful, permanent solution most effectively fitting the needs of their great city could best be provided at home.

### Champion Home Town Contest

One of the most impressive movements directed toward extensive community rehabilitation has been that of Georgia Power Co. with its annual "Champion Home Town Contest." The result has been an awakened citizenry and an organized cooperative effort. Townspeople in hundreds of communities have taken upon themselves the job of initiating wholesale improvements. Towns have been remodeled, recreational programs initiated, community buildings, swimming pools, schools, hospitals, and churches built, countless homes painted, many for the first time, and extensive areas have been landscaped. Behind all these activities Georgia Power stands always ready with the helping hands of advice and leadership. Similar programs deserving of attention are Carolina Power & Light's "Finer Carolina" competition and Arkansas Power & Light's "Community Accomplishment" contest.

The promotion of actions such as these by our sales organizations cannot help but have a far-reaching effect on relations with the public. In commending their action in these instances, it affords another opportunity to emphasize the impact on national policies which could result if such worthy efforts as theirs were multiplied throughout the many cities in which our companies serve.

Our industry has been the number one target for many years by those who have sought to bring about a socialized state. Though serious inroads have been made, the public power issue has been successfully met by many companies through skillful marshaling and use of their commercial forces. Outstanding examples are those of the five New York companies, who undertook the state-wide education of the public with respect to the development of additional power from the Niagara River, and the work of the companies in the North West. Sales personnel have served as the nucleus for these activities, and the educational work they have done is a monument to their effectiveness in problems of this kind.

Now, where does all this lead us? Four points stand out:

1. The most effective promotional work for the individual company takes place at the field or community level.

2. The activities of the sales organization afford a powerful means of reaching public relations objectives efficiently. Only a slight enlargement of the duties of sales personnel is needed, and this can be undertaken without detracting from their load building efforts.

3. Sales personnel should be kept fully informed of public relations programs, and the potential value of their aid in such work should not be overlooked.

4. The electric industry through the Edison Electric Institute should collect and make available to member companies the details of tried ideas in the public relations field at the local level to a greater extent than heretofore.

I venture to say that one of the reasons we have fared so poorly thus far in the cold war is that we have very largely been trying to influence the thinking of the people of other countries as a national group rather than to reach them as individuals. We have not been able to direct our

(*Continued on page* 266)

# Lives .... Dollars .... Friends!

**W. W. Lynch**

*President and General Manager, Texas Power and Light Company*

An address before the Twenty-First Annual Convention of the Edison Electric Institute, Atlantic City, N. J., June 3, 1953

THE Edison Electric Institute now has, and has had for many years, a splendid and active Committee on Accident Prevention. It is not my purpose, nor the purpose of the Board of Directors' Subcommittee, which I represent, to encroach upon the functions of the Committee on Accident Prevention, but, rather, to implement their fine work by developing, if I may, a keener interest in the betterment of the attitudes toward safety on the part of executives of electric companies.

A few thousands of our fellow workers failed to get home for dinner during this last year. Some of them, who were not too nauseated, had thin soup served in a hospital ward. About 129 had nothing to eat—for dinner is not served in the morgue. These were the 129 who started the year with us as fellow members of this great industry, most of them in fine health and with proud families, who are remembered today with small markers in the graveyard. Scores of others, still with us, are minus an arm or leg or an eye. I hold as a major premise that most of these tragedies in our industry are avoidable if all of us, including those who work on the lines and in the stations, will put our minds and our hearts into the job of preventing accidents. If there is agreement on this major premise, then there can be little doubt as to the importance of safety. At the risk of over-simplification, I want to sum up the importance of accident prevention in three short words. These words are:

"Lives . . . ."

"Dollars . . . ."

"Friends!"

The most far-reaching of these is "Lives."

I shall not dwell long on the importance to each one of us individually and to our companies and upon the frightening responsibility which is ours, of doing everything reasonably within our power to develop programs within our companies which will protect and save the lives and prevent the unnecessary and avoidable disabling

W. W. LYNCH

and suffering of our fellow employees. There is perhaps not a lineman working in the industry today who is not just as anxious as we are to have dinner at home with his family next Thursday night. I submit that if the only consideration were the humanitarian aspect of saving lives and of preventing hardship and suffering, the improvement of our safety records would justify our keenest personal interest and our best and most sincere efforts. But there are still other considerations.

One of these is "Dollars."

What can an improved safety program mean to us in the way of dollars? There are perhaps many ways to appraise the economic value of an effective accident-prevention program.

I might just add in passing that the most reliable estimate of the economic loss due to accidents involving electrical contact in our industry amounts to approximately $150,000,000 annually.

One of our casualty insurance companies in Texas has prepared some figures which offer a graphic presentation of the dollar value of a sound safety program. This insurance company chose at random ten of its larger clients (those paying annual premiums on Workmen's Compensation Insurance in excess of $10,000) which were known to employ the latest and most scientific methods of accident prevention. The records of these ten companies are shown graphically on the left side of Fig. 1. Ten other employers were chosen which had experienced debits on their insurance rate structure continuously for five years, and were known to regard modern safety practices as somewhat of a nuisance. Now here is the payoff—and, just at this time, we are referring only to dollars: the manual rate—that is, the rate based on the average of all employers in Texas—applied to the ten employers having good safety programs would have amounted to $3,771,574. However, due to their experience rating, which is just another way of saying due to their good safety records, they received credits amounting to 28.5 per cent, or $1,076,724, or actually had to pay out in premiums only a total of $2,694,850. On the other hand, the ten employers with poor safety records would have paid, on the manual rate, annual premiums of $786,563. The debits due to their poor experience rating amounted to 26 per cent, or $209,693, making their total annual premiums $996,256. It is significant that the difference in the premium rate paid by these two groups of employers, chosen on the basis of their safety records over a period of five years, amounted to approximately 55.2 per cent. In these days of rising costs, where else can we find a major expense item that can be trimmed by such a large percentage?

Fig. 2 represents the same type of comparison made between smaller employers—those paying annual premiums between $2,000 and $8,000 per year. The value in dollars of good safety practice is again revealed in this comparison, the difference in premium rates being approximately 61.6 per cent.

This same insurance company which prepared these charts, during the first six months of 1952, incurred losses amounting to $1,250,000 in excess of

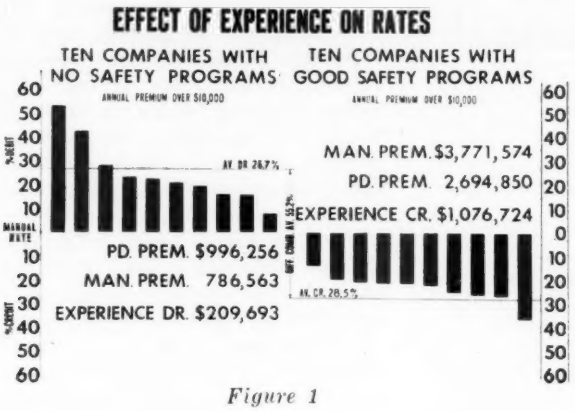



*Figure 1*

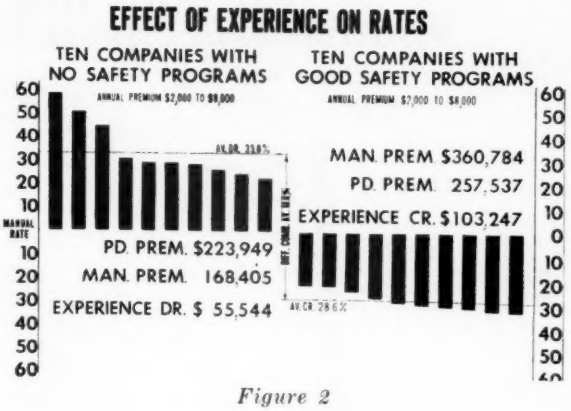

EFFECT OF EXPERIENCE ON RATES
TEN COMPANIES WITH NO SAFETY PROGRAMS
TEN COMPANIES WITH GOOD SAFETY PROGRAMS
MAN. PREM $360,784
PD. PREM. 257,537
EXPERIENCE CR. $103,247
PD. PREM. $223,949
MAN. PREM. 168,405
EXPERIENCE DR. $ 55,544

*Figure 2*

losses allowed in the premiums. This company immediately quit soliciting business and had its salesmen join its safety department. All joined in calling on policy-holders and urged improved accident prevention measures. As a result, the loss ratio was reduced by 17.3 per cent by the third quarter of 1952. Dollars are importantly involved in a company's safety record.

And now, may we think in terms of "Friends." What is an improved safety program worth in good will?

Since the dawn of creation, when our prehistoric forebears cowered during lightning storms, men have feared the destructive forces of unharnessed and undisciplined electricity. Our great industry, through science, technology, and management, has harnessed and disciplined this force and made of it a great benefactor of mankind. Yet, we must know that with all our science and technology, this same power—which can light our homes, turn the wheels of our factories, and even save our lives—will, if not properly disciplined and respected, snuff out our lives and destroy our property. While there are many electrical accidents involving the public over which we have little or no direct control, I think we can properly assume that the public generally is inclined to attribute to our negligence any destruction of life or property brought about by this force which is always and almost exclusively identified with our industry. This probably imposes upon us the responsibility of educating the public, whenever and wherever we find opportunity, to the destructive power of electric energy when its hazards are not properly respected.

Many electric companies have long experienced praiseworthy safety records. Yet, when taken as a whole, the safety record of our industry offers little about which to boast. Our record now stands far below the average of all industry, both in the frequency of accidents and their severity. It is significant, especially with regard to the attitude of the public, that almost three-fourths of all of our accidents are due to electrical shock or burn. Favorable public opinion and customer good will—the number of friends we have, if you please—are much at stake in this matter of safety. If the record of a particular company is not as good as the average of all industry, then its executives have important opportunities which need and justify their personal attention.

I am persuaded that no industry in our nation has through the years developed better engineers and technicians in the field of safety. Constant work is being done in the development and improvement of protective devices. All of the necessary mechanics for sound and effective safety programs have been devised. Operating practices have been geared to safety, to the point where there is a safe and efficient way to perform every task and every operation that is required in the conduct of our business.

Incorporated in the science of safety have been improved methods for the selection of people for every type of work, the result of which is to reduce to an absolute minimum the employment of those types of persons who are likely to become involved in accidents. A more realistic approach has been made to the problem of properly indoctrinating and training new employees in company policies and work methods.

Many of our safety programs now incorporate thorough and comprehensive methods of investigating the causes of accidents of every nature. Working conditions have been designed that are most conducive to accident prevention. In fact, there are available to all members of our industry the accumulated experience over a period of several decades of those companies which have led the way in the field of accident prevention. This experience, and the programs which have been built upon such experience, are willingly shared with any company interested in improving its safety record. It has been my observation that those whose work in this field has met with some measure of success possess something akin to an evangelical zeal to encourage and to assist others.

And yet there is one essential ingredient too often missing in our companies and among our workers, without which no accident prevention program will be effective. To provide this ingredient requires the interest and the wholehearted cooperation of company executives. I have reference to *attitude*. And the one attitude that is indispensable is "a tremendous respect for hazard." This must be created and stimulated and sustained continuously among all of our workers. Some have referred to it as "safety consciousness."

Let me explain it this way. A man knows how to drive an automobile. He probably has been driving for many years. In fact, he would even confess, under pressure, that he is an expert at driving an automobile. He is not contemplating taking any lessons. He knows, too, that the average car traveling at 60 miles per hour cannot be brought to a stop under ordinary road and brake conditions in less than 336 feet. Should he become involved in a

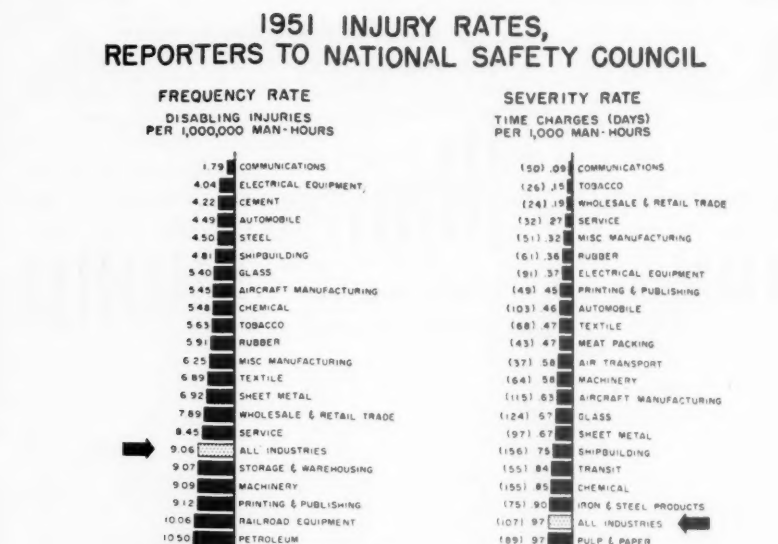



*Figure 3*

head-on collision while trying to pass another car on a steep hill—to what cause would he attribute the accident? Could a reasonable person say that he was careless? Or would it be said that he was taking a reckless chance? All of this could mean that he had failed to acquire the proper attitude of respect for the hazards involved in driving automobiles on highways today.

Let me bring an illustration a little closer home. John Doe was employed by Company "A" four years ago. He possessed every qualification required for his job classification. He had been intensively trained. He had been provided with and schooled in the company's safety manual. He had been provided the very best equipment and protective devices. The rubber gloves he carried had been scientifically and accurately tested for 5000 volts. He was perfectly equipped in every particular to perform an efficient and safe job. Yes, in every particular except one. All along the line he had failed to acquire the tremendous respect for hazard so essential to safety in our business. Perhaps he had observed safety rules being flagrantly violated by other employees with longer service records. Maybe his foreman had ridiculed some of the safety rules. Perhaps the weekly safety meetings had degenerated into boresome sessions or had just been dispensed with at times. At any rate, in the absence of this essential respect for hazard, he became numbered among the 129 who are remembered by grave markers. He failed to use his scientifically-manufactured and -tested rubber gloves while working on a 230-v secondary. Perhaps the executives of his company, busy as they were with matters of engineering and public relations and finance, through their indifference, or because of their involvement in matters that appeared more important, had neutralized a safety program which in its techniques and mechanics was very near perfect. And, unfortunately, a good safety director had been going to bat with two strikes already against him.

We have been thinking in terms of "Lives," "Dollars," and "Friends!" and how alert company executives can capitalize on each of them through their vigorous support of a well-planned safety program.

I conclude by urging your careful consideration of these specific recommendations:

Number one—*Assure Yourself:*

That the accident prevention program of your company incorporates those essential elements which have been proved effective by several decades of experience in our industry; that you have selected and employed the best human talent the market affords; that you have provided good working conditions, good job methods and specifications, safe construction standards, well equipped trucks, good housekeeping, and the best available protective equipment; that you have systematically inspected physical property and checked on employees' work habits and knowledge of safety instructions; that you have carefully investigated and brought to light all causes contributing to accidents; and that you have, in a constructive way, disciplined employees who failed to live up to accident prevention regulations.

Number two—*Assure Yourself:*

That the responsibilities of your accident prevention program have been delegated to, and actually do receive the undivided attention of, an able Director of Safety who comes from the higher levels of your administrative group, and that your Director of Safety is adequately trained both in theory and in field practices.

Number three—*Assure Yourself:*

That every responsible executive, department head, supervisor, and foreman is familiar with and shares your personal and intense interest in every worker being able every evening to have dinner at home with his family; that you expect a good safety program to receive the preferred attention that it deserves; and that you believe it will pay big dividends in "Lives," in "Dollars," and in "Friends!"

# Helping to Build a Finer Carolina

**Louis V. Sutton**

*President and General Manager, Carolina Power and Light Company*

An address before the Twenty-First Annual Convention of the Edison Electric Institute, Atlantic City, N. J., June 3, 1953

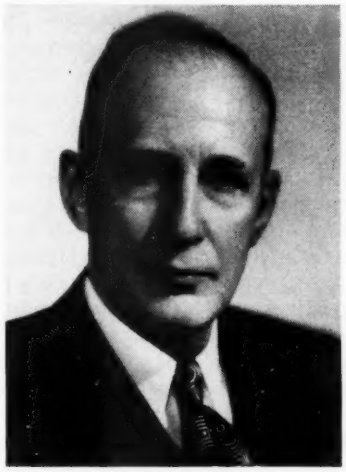
OUR section of the United States agrees with the writer of the song that "Nothing Could Be Finer Than To Be in Carolina."

Since North Carolina occupies a position of leadership among the Southeastern states and inasmuch as South Carolina is among the first states of the nation in terms of industrial gains in recent years, there is ample evidence to support the claim that either or both the Carolinas is a splendid place in which to live and work.

Since World War II, that area which the late President Roosevelt referred to as the Nation's Economic Problem Number One has become known as the Nation's Economic Opportunity Number One. Various economists have referred to the South and its possibilities for industrial development in glowing terms. Whether or not attention was focused upon the South by the movement of population during World War II or whether it is being favored by industries hoping to avoid the hazards of congestion is not a question of particular moment. The fact that the South is proving that it can support large-scale industrial development is of importance. Where industry locates will, of course, be determined by a number of factors; but it is reasonable to assume that the state which devotes itself more aggressively to preparing for industry's coming will share more generously in its arrival.

To assume that a state's own development program sponsored by its division of commerce and industry will be sufficient to attract a satisfactory portion of the new wealth would be fatal. The job is too big to be accomplished by any one agency or any one industry.

In every local office on our system hangs a map of the two Carolinas, across which is inscribed, "Our future is the future of the area we serve." In recognition of our responsibility toward the development of the area we serve, Carolina Power & Light Co.



LOUIS V. SUTTON

announced in March, 1952, a program designed to stimulate community pride and improve the economy of the various towns and communities we serve.

This program was titled "Helping to Build a Finer Carolina" because that designation applied equally well to both Carolinas. It had the further implication that area development is not a task for any particular company. "Helping to Build a Finer Carolina" suggested that we were partners in the progress of the area we serve.

### Announcement of the Program

Announcement of the program was made through dinner meetings held simultaneously in 69 towns. The selection and training of 69 individuals so that they could launch the program with enthusiasm was in itself a rather sizeable task.

The number of towns in which the announcement was made was determined by the number of towns in which newspapers were published—no newspaper publisher likes to go to a neighboring town for his story. Every eligible town that had a paper had an announcement dinner.

The dinner meetings were held on a Tuesday evening at 7:00 P.M. It was no accident that Tuesday was selected. Weekly newspapers generally go to press on Wednesday morning; consequently, they could have their papers on the street with the Finer Carolina story at the same time afternoon dailies were off the press. Any other night but Tuesday would have permitted the daily papers to "scoop" the weekly papers by approximately a whole week, and weeklies on our system out-number dailies seven to one.

To each dinner meeting were invited the mayor, members of the Town Council, presidents of civic clubs, officials of the Chamber of Commerce and other trade associations, presidents of women's organizations, newspaper and radio representatives, columnists, and other business, civic, and industrial leaders. The number attending the meetings varied from 30 to 150. In communities where meetings were not held, representative citizens were invited to attend a neighboring meeting.

Prior to launching the campaign it was necessary to compile mailing lists, address and mail invitations, prepare various pieces of literature, flip-charts for use in making the presentation, and, as mentioned before, it was necessary to train the 69 people who would make the Finer Carolina announcement.

One booklet was prepared which devoted itself to a description of the various assets of the two Carolinas and the progress they have already enjoyed. It called attention also to areas which offered the best opportunities for further development and showed how the economic advantage of the Carolinas could be served by such development.

We pointed with pride to the accomplishments that have distinguished the Carolinas, and in the same breath we admitted our shortcomings.

We proudly expressed the fact that the two Carolinas produce two-thirds of the world's bright leaf tobacco yielding over $600,000,000 annually, but we viewed with alarm our dependence upon any single major crop and

the consequent imbalance in agriculture.

We said the Carolinas can boast the greatest concentration of textile mills in the world; yet we admitted our discomfort at a sensitive industrial economy predominated by textiles.

The Carolinas are proud of their scenic wonders—ranging from the grandeurs of the Smoky Mountains to great sweeps of Atlantic shoreline. Yet we must house and feed the tourist better once we attract him.

Tar Heels tripled their per capita income since 1929, and South Carolinians quadrupled theirs; yet we registered little gain in our already low rank among the 48 states in this particular. The fact that the value of produce grown and consumed on the farm is not figured in per capita income partially accounts for the low rank of the Carolinas because we have more small farms than most states.

We are blessed with a climate that encourages dairying, beef cattle, and poultry; yet we must import milk, beef, and eggs every year to meet our home needs. We raise a lot of hogs and brag about our home-cured hams; yet we also must import pork every year. No section of the country can count more agricultural blessings; yet we do not raise enough to feed ourselves.

### Pride, Progressiveness Appeals

It was easy to publish literature "pointing with pride." We illustrated that in addition to leadership in tobacco, textiles, and wood furniture, North Carolina leads the Southeast in the total value of manufactures, farm cash income, livestock, construction, and business volume.

It was gratifying to be able to credit South Carolina with the largest number of textile spindles of any state in the nation. South Carolina also led the nation in percentage gain in new industry, percentage increase in per capita income between 1929 and 1951, percentage gain in motor vehicle registrations, and established the lowest percentage of business failures in the United States.

Yet the other side of the picture left much to be desired by way of balancing industry and agriculture and giving both a healthy diversity. There was great room for improving the social and civic elements that attract industry. Great improvements were essential if we were to continue to hold tourists already attracted by our natural assets. By appealing at once to both pride and progressiveness, we thus threw down a challenge for community betterment.

In another piece of literature, which might be referred to as a guide to action, we attempted to outline step by step the procedure necessary for each community to assume its share of responsibility in building a Finer Carolina through an enlightened approach to the problem. We provided each community with a survey form on which was asked 276 questions. By filling out the form, attention would be directed to those things which the community had, but needed to expand, or which it lacked and urgently needed. We asked each community to choose from its variety of needs five objectives on which it might concentrate during the year. The booklet suggested the type of organization which might be needed to accomplish the five objectives agreed upon.

The story told in each of the booklets was unfolded in detail by the person making the presentation at each of the 69 meetings. In addition, an outline was given of the extent to which the company planned to support the program through the various advertising media. Incidentally, the company produces its own radio show which performs before a live audience in a different town each week and which is broadcast over a Finer Carolina network of 23 stations. Each show opens and closes with the theme song, "Nothing Could Be Finer Than To Be In Carolina."

To stimulate continuing interest at the local level, we offered 23 cash prizes totalling $8,750. To make the competition equitable, towns were divided into three population groups with equal prizes for each.

Before launching the promotion we had agreed among ourselves that we would be happy if as many as one hundred towns entered the competition. When the deadline set for entering arrived, 148 towns and communities were enrolled and had begun work on a total of 887 projects.

### Public Relations Aspects

Although the promotion was launched primarily to encourage improvement of communities located within our service area, we were not unmindful of its public relations aspects. On the day following the announcement, the program was featured on the front page of every newspaper on our system. Radio stations gave liberally of their time in explaining the promotion during newscasts. Many newspapers adopted the slogan, "Helping to Build a Finer Carolina," and have carried it in type or in the form of an emblem on their mastheads ever since. Other advertisers were encouraged to take part in the promotion by making room in their own ads for the slogan. Not a single derogatory news story or editorial was found during the year in any newspaper making reference to the Finer Carolina program.

### Surprising Results

The results accomplished were surprising. Of the 887 projects selected, 130 towns listed among their projects improvement of sidewalks and streets; 98 towns decided to expand municipal facilities; 106 towns devoted themselves among other things to improving educational institutions; 139 towns listed recreational facilities as a project; 62 towns decided to do something about their religious institutions; 52 selected housing projects; and 23 listed the establishment of a new industry. Other towns in varying numbers selected other projects, many of which could be accomplished by cooperative efforts of interested citizens and many of which required raising sizeable amounts of cash or approval of a bond issue.

One town raised $100,000 in cash subscriptions, built an amphitheater and staged its first performance of an outdoor drama sixty days after the fund drive began. Another blasted a man-made channel more than 3,500 feet to the sea in order to restore shell fishing in the sound behind one of the beaches.

Swimming pools, city parks, baseball fields, and community buildings appeared all over our service area in the course of a single summer. Towns undertook beautification projects, cleaned up vacant lots and abandoned properties, set new shrubs, painted homes and storefronts, and otherwise made their communities more appealing.

True enough, few of the projects undertaken during the year resulted in direct benefit to the company. We realized from the beginning that building a Finer Carolina was a long-range undertaking from our point of

view. We let it be understood at each of the announcement meetings, however, that we did not consider the program a philanthropy—we expected in time to retrieve its cost and to profit by the investment.

Some of the towns which set out to establish new industries succeeded in their objectives. The town which took top honors in North Carolina gained a new industry which will begin operations with 2,500 employees. Construction of the plant was well under way before the year ended. Where industries were established the company, of course, will benefit immediately, not only from the new industrial load but from new homes which will be established and through distribution of new payrolls.

### Judging

Needless to say, not all 148 towns completed their projects; but all of them made progress. When the promotion came to an end, more than 100 towns submitted entries in the competition for prizes. Many of those entries were works of art—some were a simple accounting of progress. None of the judges lived in the company's service area. They agreed upon a uniform system of grading and went through the entries individually before finally getting together to resolve differences of opinion. Strange as it may seem, there were only two instances wherein the judges had not agreed until they studied the entries involved again.

After the judges had returned to their homes, Dr. S. H. Hobbs, Jr., Professor of Rural Social Economics, University of North Carolina, volunteered in writing the following statement: "I rate your contest as one of the most productive activities going on in the two states. When I stop to think of the gains resulting from some 150 communities pitching in to make their communities finer places in which to live, I am amazed that so many people have become a part of this program and that so much has been accomplished in such a short period of time. The idea is a most excellent one, and I hope your company will find it feasible to continue it.

"Any fear that communities not winning a prize might be disheartened has been allayed. Actually, community achievement should be sufficient award; and I imagine that most communities are pleased with their accomplishments even though they did not receive a cash prize.

"I enjoyed meeting and working with the other judges, and I am happy that all of us were in such complete agreement." Letters from the other two judges expressed similar amazement at what the program had accomplished during its initial year.

Aside from tangible gains which resulted last year from our Finer Carolina promotion, I wish to call attention to its value in developing good public relations. Approximately 10,000 inches of publicity of local origin appeared in newspapers on our system. An additional 6,000 inches resulted from releases distributed by our publicity department. More than 3,000 inches of editorial comment resulted. How many hours of time were devoted to the promotion by the 23 radio stations located in our service area is not known, but it can be said that every station gave the promotion liberal support.

It will be recalled that *Electrical World* devoted a front cover and centerspread to a picture-story relating accomplishments of the Finer Carolina program.

In addition to the people reached by this publicity, 148 local Finer Carolina organizations comprised a total of 5,320 individuals with whom we maintained intimate contact. Considering also members of civic clubs and other organizations which shared responsibility for individual projects, the number of people engaged in community activities under the program grew to about 20,000.

The total cost of the promotion amounted to approximately $100,000. However, more than half this amount would have been spent through normal promotions.

### Intangible Benefits

In my opinion, the company reaped other profitable, if intangible, benefits from our Finer Carolina campaign. I consider it a great morale builder in terms of tying various departments of the company more closely together as a team. For example, the speakers who originally launched the program were recruited from almost every department of the company—district operations, sales, accounting, engineering, and advertising. They took personal pride in being part of that company team and manifested that interest long after their role in the launching was past. Every department has continued to work closely with the program.

Naturally we welcomed such projects as whiteways, or lighting of ball parks and recreational areas. Our engineers tackled these projects with vigor. Our industrial promotion department worked hand-in-glove with any town making a conscientious effort to attract new industry. Our agricultural agents this year are available to hundreds of farmers participating in the soil and water conservation phase, which has our development department's heartiest endorsement.

The program's success is a matter of natural pride to company personnel and tends to encourage those who hitherto have had little active part in the program to want to help in "Helping to Build a Finer Carolina."

### No Reservations

I have no reservations about the logic of a community development program in the activities of a power company. On the contrary, I think that such community development is becoming a growing responsibility which free enterprise must face more squarely and more effectively as time passes if we are to avoid the inroads of bureaucrats who would convince the people that only a "welfare state" can offer any concerted action toward community betterment.

The growing refinements in the highly organized nature of our society —both economic and social—dictate a community consciousness that was far less urgent a generation ago. The Finer Carolina program is one effort of our company to meet that responsibility. Of course, it is by no means original. Likewise, in my opinion, it is only the beginning for our own company and for countless others everywhere. It provides a means for helping our service area to help itself—to stay out of the clutches of "radicals" who are eager to help, but only on their own terms.

It is entirely possible now that other companies will join the effort and carry forward still further. I can recommend such a program both for its tangible benefits to the service area and especially for its intangible returns in the form of good will and improved public relations. I will go even further and predict that as other power companies adopt similar programs, the idea will be extended in-

to other fields of private enterprise.

So far as our own company is concerned, we decided even before the conclusion of the first year's program that it would be continued and expanded in 1953.

During 1952 the Finer Carolina program did not provide an area of competition for rural or farm customers. Their exclusion was not an oversight because we can hardly overlook a group which comprises approximately one-third of our total customers. We simply did not find in planning the promotion last year a way to include farm customers on an equitable basis. This year farmers are included, and will compete on a basis of soil and water conservation. Every farmer in the 60 counties served by the company is eligible to participate. Of $9,550 in cash prizes to be distributed at the end of 1953, $2,800 is allocated to farmers. Their acceptance of the program was greeted with the same degree of enthusiasm that characterized community acceptance.

### Editorial Praise

Very naturally, we made some mistakes during the first year of the promotion. We tried to eliminate the possibility of making those same mistakes again when the program was announced this year. Maybe we will make some new mistakes, but of one thing I am sure—the good which will be accomplished under the program will offset, by far, minor inequities which may result from errors of judgment. I am willing to accept the editorial appraisal of one of the leading newspapers published in North Carolina, the *Asheville Citizen*. It appeared on November 29, 1952, when announcement was made that the Finer Carolina program would be continued in 1953. I quote:

> The *Citizen* is delighted that Carolina Power & Light Company has enough faith in its 1952 program to sponsor an identical one in 1953. This faith is fully justified by the enthusiasm with which literally thousands of persons in the competing cities and towns have set about to improve them. We know, in fact, of no single greater contribution to the well-being of North Carolina by a private business enterprise in modern times than the Finer Carolina program.

# Salesmanship Can Improve Public Relations

(*Continued from page* 259)

efforts on an intimate enough, individual basis. Yet, in the final analysis, it must somehow come to this if we are to be successful in this struggle for men's minds.

It seems to me, too, that there is a close parallel in these human problems we have as a nation and those human problems, we, as an industry, have in common with others. I think we can agree that there is ample evidence for us to conclude that it is essential to get as close as possible to those we want to hear our story.

And in the telling, let us not overlook the fact that we already have within our organizations our sales personnel, widely known among customers and the public, trained and skilled in the selling of ideas. Our sales people are in a fortunate position to do this. They live in the same communities with our customers, work together on the same community projects, and their families mingle socially. Aside from that, our customers have found by experience that our sales people are interested in their problems—helping to improve their products, increasing their operating efficiencies, and in many cases finding and developing markets for their products. And in the home, too, salesmen have helped to improve living standards. The opinions of our sales people are respected. Thus, they can be of great service.

### Sincere Educational Work

I think that the public today is looking to American business with an increasing amount of respect and with a mounting appreciation of the impressive contribution which industry has made and is making toward a better and more secure world. But while there is a more friendly climate toward business than at any time during the past generation, there is much more sincere educational work to be done if business is to achieve the degree of respect by the public which it properly deserves and which is essential if it is to reach its full potential as a preeminent social and economic personality.

On countless occasions throughout the year, notable subjects are discussed in a thought-provoking way. Many of these touch on problems which are a challenge to constructive national action by us and by all citizens interested in the welfare of community, state, and nation. I suggest that much good could result if these worthwhile pronouncements could be brought before a wider audience in some such manner as I have outlined. In this way more people may find a way to satisfy their desire to be a helpful force in these difficult times.

### Informational Interchange

There is a passage in Xenophon's writings in which Socrates says to a young man, "My good boy, just as another person takes pleasure in a good horse or dog or bird I take pleasure in my friends and if I have something good, I share it with my friends . . . if we find something good, we pick it out and we consider it great gain if we become beneficial to each other."

In the electric power industry there are many and unusual opportunities for us to become beneficial to each other. It is almost an industry tradition that if we have something good we share it. Each year literally hundreds of ideas are conceived and plans devised by electric companies. But I think there are possibilities of even more extensive interchange than at present. Let us strive at all times to improve this flow of constructive, helpful thought.

In our foremost position among the nation's great industries we have an obligation of citizenship. And in its fulfillment, the leaders in this great industry of ours can be a powerful directive force in charting the course the nation will follow tomorrow. Responsible businessmen must continue to furnish society with material satisfactions. This we have done eminently well through war and peace. But we must also, and perhaps in the end this is the most important thing of all, strive at the same time to improve understanding of and to strengthen our social and economic structure, for by so doing we contribute toward the preservation for future generations of our great American heritage.

# The Iowa Plan

**N. Bernard Gussett**

*President, Iowa Power and Light Company*

An address before the Twenty-First Annual Convention of the Edison Electric Institute, Atlantic City, N. J., June 3, 1953

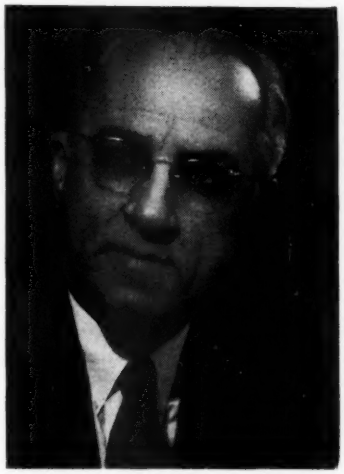
YES, the investor-owned electric companies of Iowa do have a Plan. It is my purpose to discuss some of its details, the needs which brought it into being, and the hopes which we place in it for the future.

To some, it is known as the Iowa Plan, to others as the Expressways of Power Plan, but its title is of little importance. What *is* of importance is that as a plan it is alive and useful, that it already has served as the framework upon which important progress has been made, and that it stands available for the future.

No business can for long succeed these days without planning, not only for the present, but also for the future. This is particularly true of the investor-owned electric business, where plans for personnel, power supply, financing, safety, new business, purchasing, load building, fuel, dividends, and a thousand other parts of the whole must always be adequately ahead of the need and the performance. It will not therefore be surprising that what may well be considered the first major step in the Iowa Plan came as the natural result of business planning and of business needs.

Iowa is, in all respects, dedicated to neatness and order. Neatly placed, near the geographical center of our nation, its boundaries form a neat rectangle except for a slight protuberance to the east occasioned by the necessity of effecting a closure with the rough western boundary of Illinois. It is divided into 99 neat little counties, rectangular in the main, and these in turn are divided into mile-square sections occupied by cities, towns, villages, and those agricultural factories known as Iowa farms.

In connection with its geographical location and its particular importance to the matters discussed herein, it is interesting to note that just across the Missouri River from Iowa is located Nebraska, a state in which all of the electric companies are government-owned (Fig. 1).



N. BERNARD GUSSETT

In 1947, Iowa was served, in the main, as it is now, by eight principal investor-owned electric companies. I am sure that each had its plans. In fact, those plans had been so well laid and carried out, together with those of REA-financed cooperatives and municipally owned electric systems, that Iowa has been overlaid with a network of transmission and distribution facilities so close-woven that it is far easier to describe it in general terms than to attempt to show it upon a map of any reasonable scale.

Generating stations were numerous and, in relation to the load and advancement of the art, well located. Transmission and distribution facilities were adequate. The needs of the electric customers were fully taken care of. No power shortage existed and none threatened.

Industrially speaking, Iowa is no Michigan, no Ohio, no Pennsylvania. It may hope eventually to be, but it is not now and was not in 1947. Therefore, the exercise of good business judgment had indicated that the most economical development of the various systems lay in the several companies making all arrangements within their own service areas for the supply of those areas. Distances were great, loads, relatively speaking, were small; the time had not yet arrived for extensive interconnections, gridding, or pooling.

The managers of the investor-owned electric companies, in common with the managers of other types of American business, must ever keep foremost in their minds the admission that taxes, amortization, operating expenses, interest on debt, and regular dividends are very real and must be provided for day by day and year by year on property extensions. This appreciation has caused these managers to exercise their best business judgment toward the end result of adequate, dependable, and forward-looking service, but likewise has restrained them from hazardous excursions into the wide blue yonder. The success of such a philosophy is shown in the maintenance, simultaneously, of the high level of electric service in the United States and in the high quality of electric company securities.

On the other hand, the lack of these business checks and balances has resulted from time to time in flights of unadulterated fancy by certain officials and employees of the government. Iowa has seen some of these flights at close range, but more of that later.

Such, then, was the situation as of the end of 1947. However, despite the absence of heavy industrialization in Iowa, loads were increasing and our thinking and planning, and, in several instances, the action began to be along the lines of extensive construction which would be justified by lower reserve percentages, emergency availability, and economy interchange. Two of the largest of the eight companies were banded together with two in Missouri to form the United Power Pool.

This in itself may hardly be worthy of note from the standpoint of the industry as a whole, but one of the incidental results of that pooling has turned out to be of tremendous importance to us in the Midwest and may be

*Figure 1*

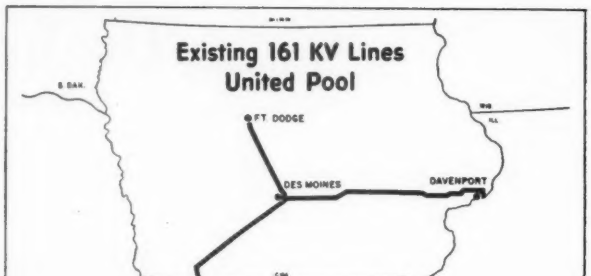



*Figure 2*

one of the straws which eventually will break the back of the scheme for nationalization of our industry.

An early result of that pooling was the construction in 1948 of a 161,000-v transmission line from east to west across the state, from Davenport to Des Moines, with a tap to Ft. Dodge, to St. Joseph and Kansas City, 465 miles in all, of which 353 miles lay in Iowa (Fig. 2).

All of the companies included in their expansion studies the potential firm, secondary, and dump of the taxpayer-financed, Federally-owned hydro developments, existing and proposed, on the upper Missouri River. That is, they took them into consideration insofar as public announcements, often vague and contradictory, permitted. Actually, it seemed highly improbable that Iowa would receive any worthwhile amount of this hydro, as the Department of the Interior had limited the market area to a 150-mile radius from the dam sites, as shown in Fig. 3. Moreover, approximations by qualified engineers indicated that Interior was correct in such limitation, inasmuch as the Dakotas and Nebraska could and should be permitted to absorb whatever firm power was produced at the dams and the secondary and dump could not be economically transported much past the 150-mile radius.

Thus the situation stood until January 28, 1951, when the Bureau of Reclamation released information to the effect that the 150-mile limitation had, all along, been a purely temporary boundary for the marketing of firm power and that, effective immediately, the radius was increased to 250 miles, as shown in Fig. 4.

This action vastly expanded the Iowa portion of the proposed marketing area. It is of interest that this expansion, in my opinion purely of an arbitrary nature, vastly overran the Missouri Valley area and infringed on the valley of the Mississippi. Also, and this may be purely accidental, it included the Des Moines industrial area, the largest load center in Iowa, and came within a matter of a few miles of Minneapolis and St. Paul.

At the same time, the then Secretary of Interior announced "plans for the necessary backbone transmission grid to be constructed by the Bureau (of Reclamation) to transmit Federally produced power throughout an ultimate power marketing area extending 250 miles from Federally constructed and operated hydroelectric

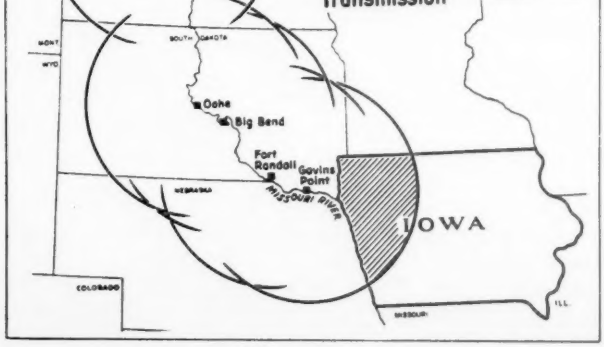



*Figure 3*

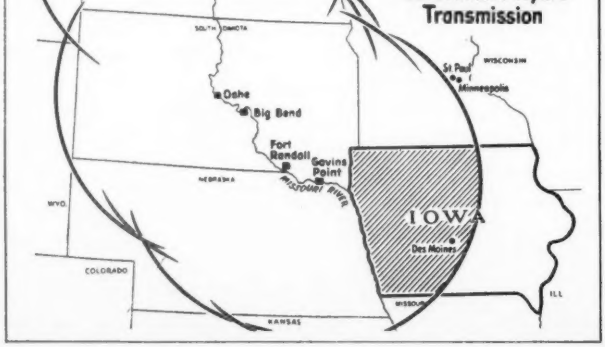



*Figure 4*

plants on the Missouri River." A map accompanied the release, the indicated lines in Iowa, the 161-kv lines which we already had in service and the 161-kv lines which we were planning as elements of sound growth being shown in Fig. 5. The duplicative characteristics of the Bureau lines are obvious.

To those of us who were familiar with local arrangements, local plans, budgets, and load growth prospects in Iowa, the indicated Bureau lines were not only highly duplicative but in many respects were practically inconceivable from the standpoints of either engineering or economics. However, we were not so naive at that time as to believe that either economics or engineering were necessarily controlling influences in the spending of taxpayers' money. Therefore, the electric company managers of Iowa met to discuss the matter.

Our meeting rested upon the sound foundation of a state utilities association. The very existence of that foundation permitted us within a minimum space of time to review our individual construction plans for the foreseeable future and to determine if the hydro data at hand were sufficient for us to decide if our plans were adequate for Iowa without the construction of Bureau transmission lines in our state.

It was unanimously decided that the hydro data available to us were open to serious question as to the amounts of firm, secondary, and dump power which might be produced by the developments and particularly as to the amounts, if any, which might be available to Iowa. As a result, engineers of national repute were employed and asked to make a study of the electric potentials of the Missouri River hydros.

Such a study obviously would require a considerable time to complete. In the meantime, funds for certain of these proposed Iowa lines had been included in the Interior budget request. I wish to stress the expression "certain lines." The general procedure in such processes of infringement is decidedly not whole hog or none, but one of inclusion in a Federal budget here and in a Federal budget there of a few miles here and a few miles there until, presto, the job is done.

Based upon our knowledge of the electric facilities and loads, present and future, of Iowa, we felt reasonably certain that there was no need for these Bureau lines in Iowa. We were absolutely convinced that the lines initially proposed were duplicative of lines already set up in our budgets for early construction.

Representations to this effect were made to the Congress on March 6, 1951. The congressional committees were advised that we had no power shortage and did not propose to have one, that present and planned generating and transmission facilities would take care of the needs of Iowa without the assistance of the Bureau, that many of us had in effect cooperative procedures with the REAs and the municipals and that more were planned, and that if and when any Federal hydro power came to Iowa, we stood ready to deliver it to the customers over facilities which would not cost the taxpayer one cent. The result of this was that the Bureau was refused all requested funds to build transmission lines in Iowa.

I am hopeful that this was one of the decisive actions which history will show as the turning point in the reckless planning for the construction of a network of Federal transmission lines which inevitably would have converted a goodly portion of the Midwest into a playground for those dedicated to the nationalization of our industry.

In the fall of 1951, the consulting engineers' report on the electric power and energy potentials of the Missouri River hydroelectric developments was received. Its conclusions were so startling and its estimates of the amount of firm power so very low in comparison with hydro nameplates and the hundreds of millions of dollars spent or planned to be spent on hydro facilities that it was studied, restudied, and factors of safety applied on top of factors of safety. Even then, the inevitable conclusions were, first, that the amount of dependable year-in and year-out firm power from these developments would be almost negligible in relation to the present and future power needs of the Missouri Valley; second, that while substantial amounts of dump would be available on a fuel offset basis during wet years, the distance of transmission would economically preclude its use much beyond the Dakotas and Nebraska; and, third and last, that Iowa could not count upon receiving a dependable kilowatt or an economical kilowatthour from these projects in the foreseeable future.

Therefore, in January, 1952, representatives of investor-owned electric

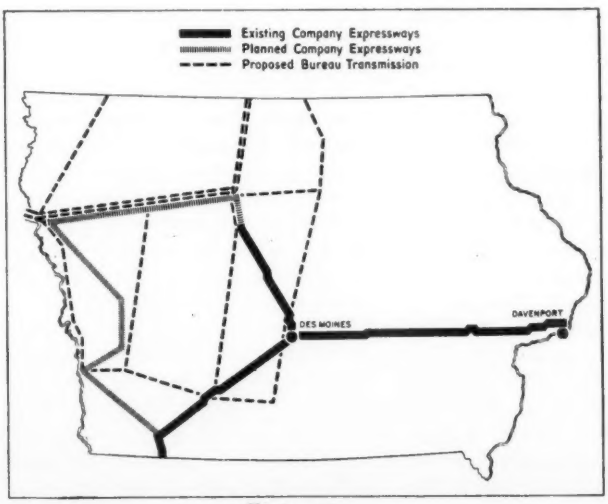



*Figure 5*

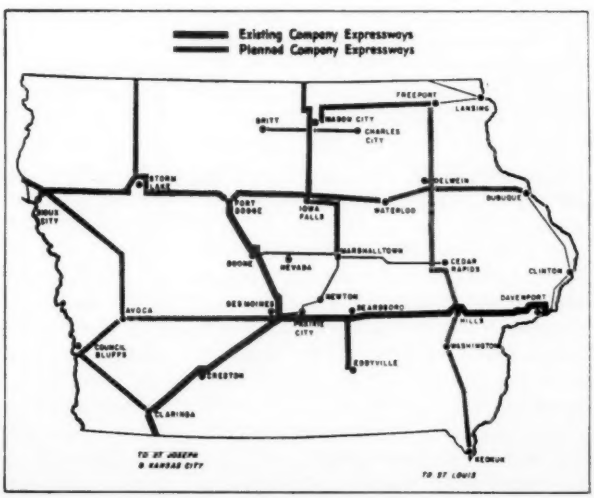



*Figure 6*

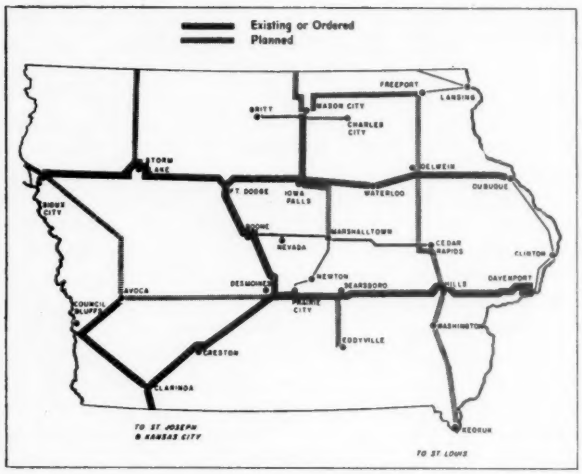



*Figure 7*

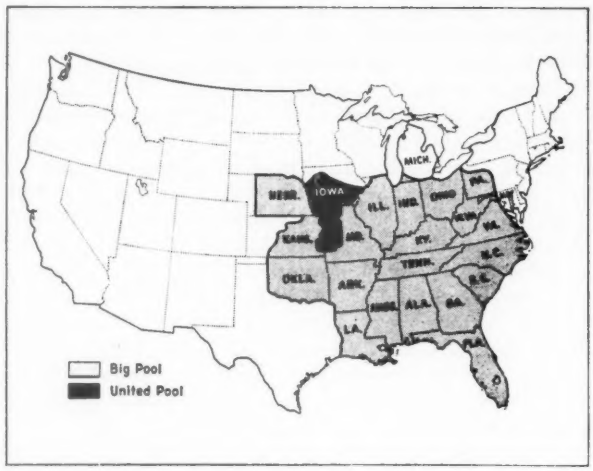



*Figure 8*

companies met again, and the true Iowa Plan began to take shape. In a spirit of cooperation and with the full realization that the good of one most probably would result in good for all, we embarked upon a state-wide study with the objectives of firm and dependable large-capacity interconnections and of the development of an Iowa grid. We were convinced that the required investments would be justified by obvious operating advantages. Also, that such an arrangement might, in the long run, benefit the taxpayer in that the Iowa lines would stand ready to receive and transmit to consumers any hydro energy which might conceivably be delivered to them after the full needs of a normal distribution area had been met, this particularly in very wet years.

From its very beginning the study offered promise. This promise grew with increasing loads until in August of 1952 we were able to make public announcement of a statewide grid plan which is shown in Fig. 6.

The United Pool line formed the foundation of this new structure. This grid, when completed, would give us two major lines from east to west, three from north to south, and numerous takeoffs.

A study was immediately initiated which looked to a public and employee information program for the investor-owned electric companies of Iowa and which would be second to none. The need for this was obvious. Each company had been planning its own individual information program, but coordination had been lacking.

That was in August of 1952. By June of 1953, we had made great progress toward the accomplishment of the goals of the overall plan. First, our public and employee information program was approved, adopted, and actively set in operation on April 16, and concrete results will soon make their appearance. Second, an Iowa Pool has received extensive study, and pool contracts are now under consideration. Third, studies are being made in regard to the feasibility of constructing large thermal plants in the Iowa coal fields, financing being based either on firm resale contracts or joint ownership. Fourth, the present status of the grid is shown in Fig. 7.

The big line from Sioux City to Waterloo is actually under construction, material is on order, and right-of-way is being obtained for the extension on to Dubuque. Other lines are being built. It is my considered opinion that the entire grid will be completed in the not too distant future, and that it will be enlarged.

On November 7, 1952, the United Pool participant areas in Missouri and Iowa were synchronized with and connected to those of the so-called Big Pool, and thus the investor-owned electric companies took another big step toward the not-too-distant day when their interconnected facilities will stretch from Canada to Mexico and from ocean to ocean (Fig. 8).

It should be of special interest to the taxpayers of our nation to know that this Iowa grid, tied in with the transmission layouts of the other electric companies, public and private, offers promise of a worthwhile steam-hydro integration which could well lead to much better utilization of the tax dollars already spent on Missouri River hydroelectric projects, the feasibility of which is questioned by many. Suggestion that such a study be initiated was officially made to then Secretary Chapman on March 26, 1952, the specific suggestion being that he invite electric company representatives to meet with him for the purpose of studying the situation. Correspondence over a period of several months developed the Bureau opinion that grave doubts existed as to the desirability of making contracts for integration with power systems which were beyond the area served by Federally owned transmission lines. It seems to me that this might have been a matter of political philosophy rather than of engineering or of business. Now that Secretary McKay has assumed the duties and responsibilities of the office of Secretary of the Interior, the March 26, 1952, suggestion is made again. We shall be glad to meet with him at any time to discuss this matter.

It is not expecting too much to hope that such a meeting might be an important step toward the development of a long-needed national power policy, a policy that will be realistic, designed to produce the greatest good for the greatest number, and which will fit the needs of our country as a whole by coordinating our resources and our efforts. It is not too much to hope that it might serve as a foundation stone upon which we can begin again to build that confidence between the government and its people which is so necessary to our continued survival in a world of conflict and unrest.

# Economics and Developments to Expect in Transporting Energy

**C. N. Phillips**
*Director of Research, Ebasco Services Incorporated*

An address before the Twenty-First Annual Convention of the Edison Electric Institute, Atlantic City, N. J., June 3, 1953

BY MEANS of charts and a brief discussion, I propose to explore some elements of one of the important economic and engineering problems in prospect for the electric industry—that of transporting energy.

The primary function of this great industry is the conversion of raw energy into electricity, and its transportation from the point of conversion to the customers' premises on instant call, day and night, during all seasons of the year.

### Primary Responsibility

The primary responsibility of the industry is to furnish at all times an abundant supply of electricity at the lowest possible cost to the consumer consistent with good service. Fast-moving inflation has made more difficult the successful discharge of this responsibility. So far, good management, technological improvements, pooled operation of interconnected systems, and business volume have enabled the electric companies to be the one major industry that has made no material increases in the price of its product. Continuation of this success will require every possible further improvement in efficiency and economy.

The figures, costs, and prices used in our study are on the high side and are comparable averages for representative conditions anticipated in the immediate future. Specific situations will differ from these averages because of location, construction and operating advantages or difficulties, labor rates and performance, and the many other factors that control costs. No attempt has been made to forecast the trend of inflation or recession; however, the relation between the figures should remain reasonably constant, regardless of the course of prices.

The study also has been confined to solid fuel steam-electric power. Gas and oil are widely used today, but we believe that energy for the greatly augmented loads of the future must be carried in the main by coal-burning generating stations.

C. N. PHILLIPS

Our transportation of energy study covers distances up to 700 miles, blocks of power up to 3,600,000 kw, and transmission voltages up to 460 kv.

Our study is an area approach to the problem, applicable both to individual companies and to groups of companies seeking a dependable source of base-load power for the greatly expanded loads anticipated for the future.

### Growth of Energy Load

The extent and scope of the business and of the responsibility of the electric companies to the nation can be envisioned by considering the tremendous growth of the energy load to date, and the prospective requirements in 1975 per the report of The President's Materials Policy Commission, commonly called the Paley Report (Fig. 1). The generation of every kilowatthour of potential hydro power, good, bad, and indifferent, would supply only a small proportion of the 1975 requirement. Steam-electric power and energy must be the main reliance for the future.

Already, big concentrations of load are requiring larger and larger generating stations. Today, 14 steam-electric plants of over 500,000-kw capacity are in service and under construction, compared with only four 10 years ago.

The manufacturers have been and still are doing a fine job in meeting the demand for larger and more efficient generating equipment. When we look back over what has taken place in a brief span of years, the accomplishment appears truly remarkable (Fig. 2). The end is not in sight. In the near future the manufacturers of power plant equipment expect to make further substantial advances in both size and performance of turbines, generators, and boilers.

### Increase in Size and Efficiency

The increase in size and efficiency of steam-electric generating units has been and will continue to be of great aid in keeping down the cost of electricity. To illustrate some of these advantages we have prepared Fig. 3. The costs and economies shown are, of course, relative. They cannot be made specific without the assumption of specific conditions and design.

Fig. 4 stems from the preceding diagram and illustrates the decreasing incremental costs and improved efficiency realized by using larger generating units. The stacks in the back row show results obtained by installing 100,000-kw units. The middle row of stacks shows the costs and economy of the 150,000-kw incremental block of power secured by increasing the size of the units used from 100,000 to 250,000 kw. The front row of stacks shows the costs and economy of the 200,000-kw incremental block of power obtained by increasing the unit size from 250,000 to 450,000 kw.

Incremental capacity at $105 per

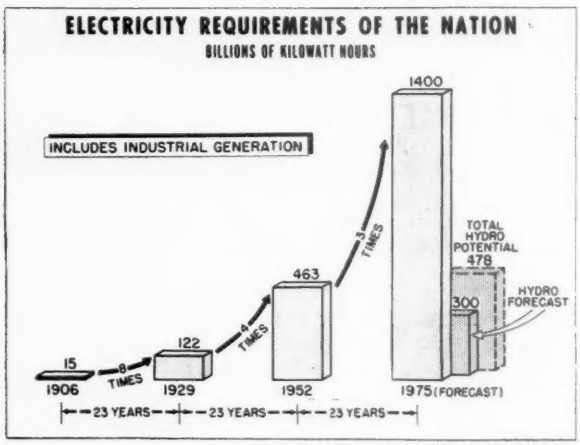



*Figure 1*

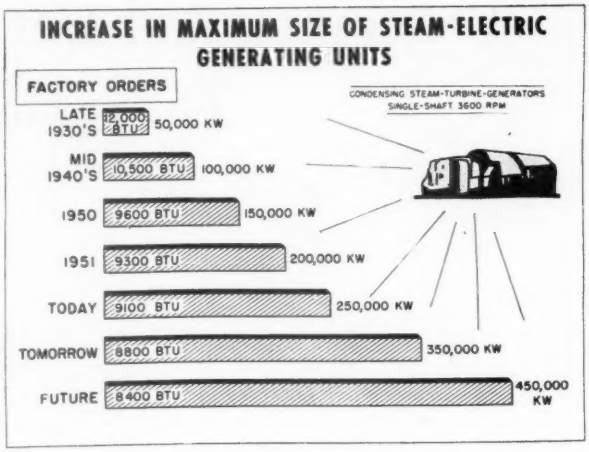

INCREASE IN MAXIMUM SIZE OF STEAM-ELECTRIC GENERATING UNITS
FACTORY ORDERS
CONDENSING STEAM-TURBINE-GENERATORS SINGLE-SHAFT 3600 RPM
LATE 1930'S 12,000 BTU 50,000 KW
MID 1940'S 10,500 BTU 100,000 KW
1950 9600 BTU 150,000 KW
1951 9300 BTU 200,000 KW
TODAY 9100 BTU 250,000 KW
TOMORROW 8800 BTU 350,000 KW
FUTURE 8400 BTU 450,000 KW

*Figure 2*

kw, operation and maintenance at $1.83 per kw year and economy of 7,525 Btu per kwhr—these are indeed important gains.

Turning to transmission lines, increases in voltage and capacity have taken place over the years (Fig. 5). Voltages as high as 400 kv are in service abroad. American manufacturers say they are able and willing to build very high-voltage equipment as needed by the industry and will hazard estimates as to probable costs.

In making our transmission study, double-circuit steel-tower lines were generally used as single channels. Both circuits of any line section could be out of service without cutting down transmission capacity. Intermediate switching stations, series capacitors, multiple conductors per phase for extra high voltages, and similar devices already in use here and abroad were employed when found to be economical. Step-up and step-down transformer stations were included but no "along-the-line" load taps. There appears to be no sound reason for departing from three-phase and 60 cycles.

Fig. 6 illustrates one of the main advantages of transmitting power in large blocks—that of lower construction cost per kilowatt. In each case shown on the chart the voltage, wire sizes, and other physical and operating characteristics used are the most economical for each block of power for each distance shown.

With these economic advantages of the large-unit base-load generating station and heavy transmission lines of the future in mind, the primary study was based upon (Fig. 7):

1. A coal-burning steam-electric station of four units each of 450,000 kw net capability with an economy of 8,400 Btu per kwhr, and 80 per cent load factor which is equivalent to 7,000 hours per year. The total of 1,800,000 kw is about the largest concentration of capacity in one spot that would not involve extraordinary and expensive coal-handling and storage facilities and operation. The development of other and more economical means of coal-handling might increase what now seems to be the size limitation.

2. Transmission facilities that would be the most economical for that block of power for each transmission distance up to 700 miles.

Freight rates on bituminous coal were next considered. They have increased sharply since World War II. Whether or not freight rates on coal will continue upwards is an important factor in a study such as this. Our figures, of necessity, are based on the continuation of the carload rates as they exist today.

In reality, rates should be down for trainload coal deliveries to modern large steam-electric stations. With one

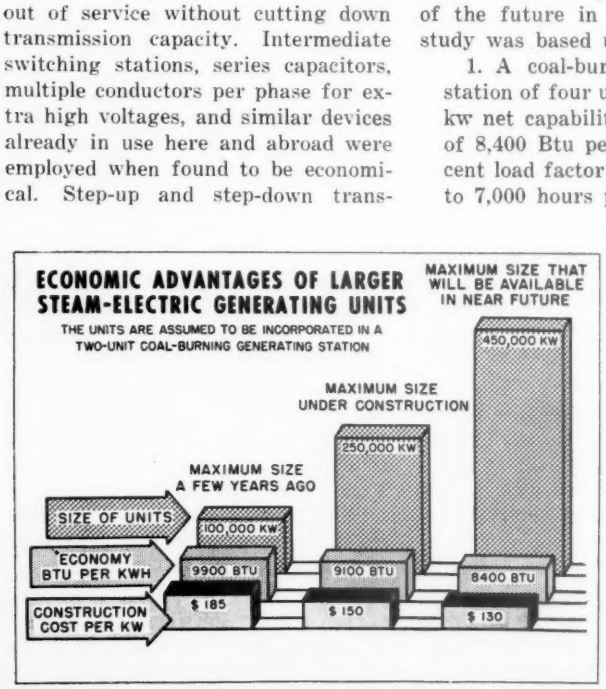

ECONOMIC ADVANTAGES OF LARGER STEAM-ELECTRIC GENERATING UNITS
THE UNITS ARE ASSUMED TO BE INCORPORATED IN A TWO-UNIT COAL-BURNING GENERATING STATION
MAXIMUM SIZE THAT WILL BE AVAILABLE IN NEAR FUTURE
450,000 KW
MAXIMUM SIZE UNDER CONSTRUCTION
250,000 KW
MAXIMUM SIZE A FEW YEARS AGO
100,000 KW
SIZE OF UNITS
ECONOMY BTU PER KWH
9900 BTU
9100 BTU
8400 BTU
CONSTRUCTION COST PER KW
$ 185
$ 150
$ 130

*Figure 3*

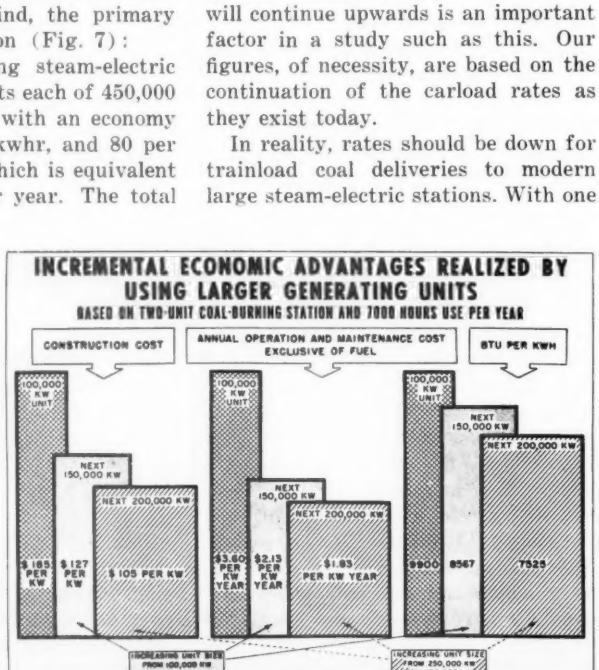

INCREMENTAL ECONOMIC ADVANTAGES REALIZED BY USING LARGER GENERATING UNITS
BASED ON TWO-UNIT COAL-BURNING STATION AND 7000 HOURS USE PER YEAR
CONSTRUCTION COST
ANNUAL OPERATION AND MAINTENANCE COST EXCLUSIVE OF FUEL
BTU PER KWH
100,000 KW UNIT
NEXT 150,000 KW
NEXT 200,000 KW
$ 185 PER KW
$ 127 PER KW
$ 105 PER KW
$3.60 PER KW YEAR
$2.13 PER KW YEAR
$1.83 PER KW YEAR
9900
8567
7525
INCREASING UNIT SIZE FROM 100,000 KW TO 250,000 KW
INCREASING UNIT SIZE FROM 250,000 KW TO 450,000 KW

*Figure 4*

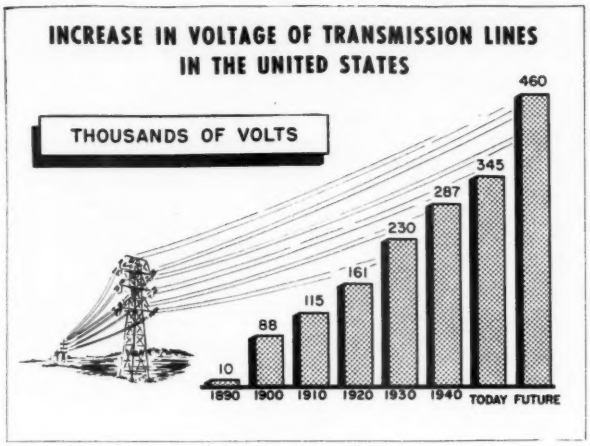



*Figure 5*

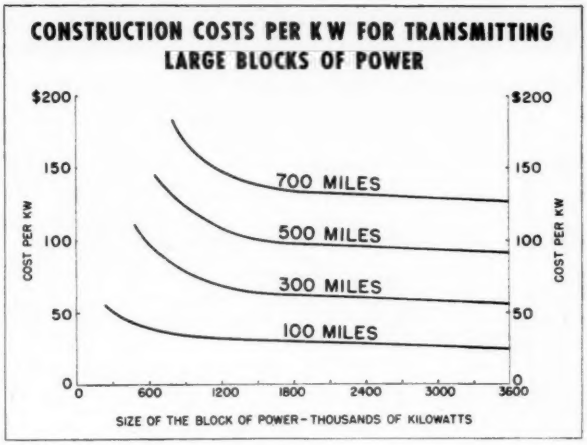



*Figure 6*

lone exception, freight rates on coal are by carload lots that presumably do not reflect the savings realized by the railroad through trainload operations. The electric companies, through their large new generating stations, create the opportunity for such savings and they should participate in them.

At the present time, over 80 per cent of the coal mined in this country leaves the mine in railroad cars. Freight rates on coal vary widely with locality, the degree of competition from other transportation methods, and the availability and cost of other fuels at the destination points. Fig. 8 shows what was found when 193 examples were plotted to show cents per ton-mile and short-line rail distances. An envelope has been drawn around them which, among other things, shows the wide variations between rates for the same length of haul.

When the freight rates, as shown in Fig. 8, are analyzed in a practical manner, we find that the envelope can be represented by a two-part formula. The first part is a constant including the cost to the railroads of supplying the cars, their "dead" time, and the cost of getting the loaded cars rolling on the main line towards their destination. The second component is a mileage charge. Fig. 9 illustrates what this freight rate envelope looks like when translated by these two-part formulae into mills per kilowatthour based on a power plant economy of 8,400 Btu per kwhr and 12,000 Btu coal.

Thus, the freight costs used in the study are general figures representing the range of rates on coal transportation over the nation as a whole. Specific rates vary widely between geographic areas, and within regions.

Fig. 10 is the same as Fig. 9, with data added to show the cost of piping natural gas, and the cost of barging coal. Both of these means of transporting raw energy are less costly than rail-haul. The relation between them, however, is relative, not absolute, because the hauling distance between two points is not the same by the three methods.

Trucking is sometimes economical with short hauls, despite the highway complications. Currently, the use of pipelines for transporting coal is under study. Fine coal is to be mixed with water, pumped through a pipeline and dried at destination. Much is claimed for long-distance belt conveyors, as they have already proved their worth on short hauls.

Reports indicate that both of these latter methods may be a means of reducing transportation costs below present railroad rates, but so far there are no definite figures available on them. In general, the results of this study are decisive when based on railroad rates, and any attempt to develop representative costs for these alter-

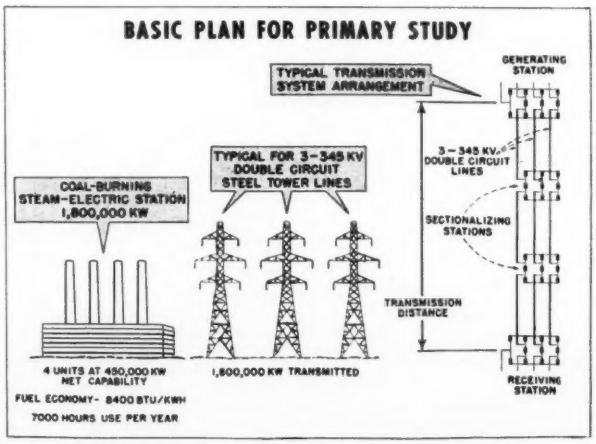

BASIC PLAN FOR PRIMARY STUDY
TYPICAL TRANSMISSION SYSTEM ARRANGEMENT
GENERATING STATION
3-345 KV. DOUBLE CIRCUIT LINES
TYPICAL FOR 3-345 KV DOUBLE CIRCUIT STEEL TOWER LINES
COAL-BURNING STEAM-ELECTRIC STATION 1,800,000 KW
SECTIONALIZING STATIONS
TRANSMISSION DISTANCE
4 UNITS AT 450,000 KW NET CAPABILITY
FUEL ECONOMY- 8400 BTU/KWH
7000 HOURS USE PER YEAR
1,800,000 KW TRANSMITTED
RECEIVING STATION

*Figure 7*

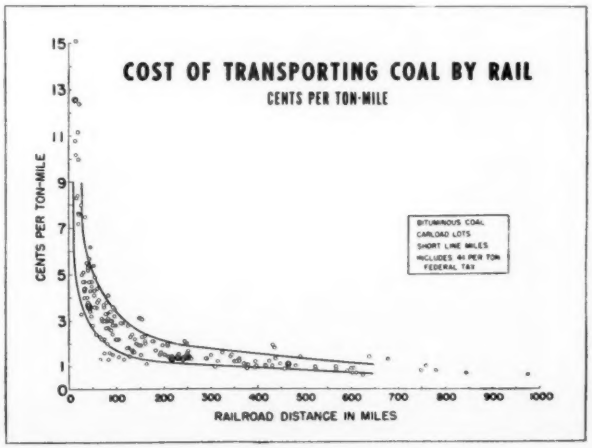



*Figure 8*

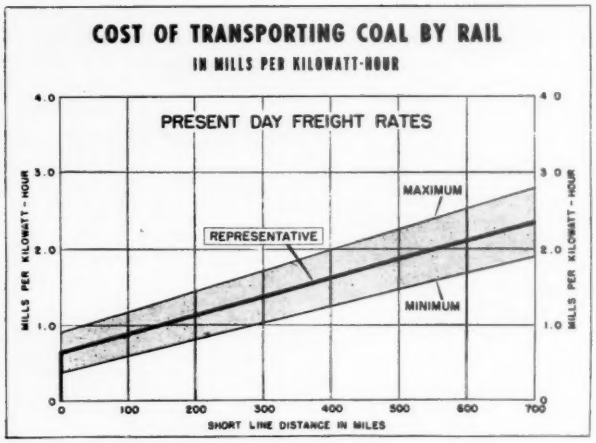



*Figure 9*

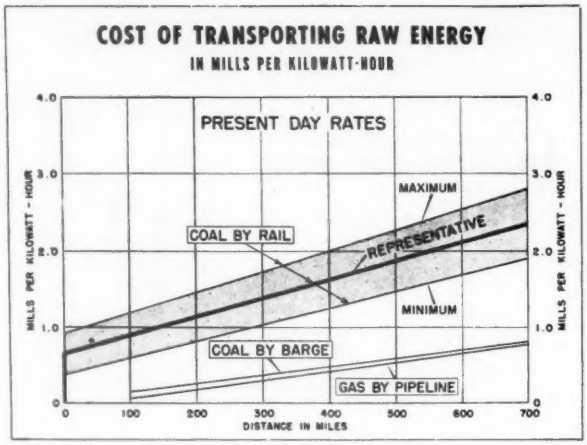



*Figure 10*

nate methods would seem at present to be unnecessary.

Electric transmission costs for transporting 1,800,000 kw have been translated into mills per kilowatthour for distances up to 700 miles. Fig. 11 is on the same scale as the one for railroad rates. The vertical section starting at zero represents the costs of the step-up and step-down stations. The results for less than 100 miles are illustrative only. Exact computations for these distances would require the consideration of short-distance refinements which were not included in our long-distance transmission study. The chart shows the cost of transmission using various percentages for fixed charges, including all taxes, so that a choice can be made of the one which most nearly fits the particular conditions.

With the preliminaries out of the way, the real problem is presented. Where should this power plant of the future be located? (Fig. 12.) At the mines? Some place between the mines and the load center? At the load center?

Now, of course, the electric companies do not have a free choice of location. The availability of cooling water or of a practical site may govern. Loads located between the mines and the main load center, interconnections with other companies, and existing transmission lines and power plants may influence location. But in order to develop the fundamentals of the problem under consideration, we must assume that there is a free choice among locations, which differ only as to distance from the main load center.

The first case to consider is the location of the generating station close to the mine or mines, but at a site requiring the transportation of the coal to the generating station in railroad cars at standard railroad rates. In Fig. 13 we have shown it 30 miles away from the mine mouth, but it could be at any other spot along the route. For these conditions, it is obviously more economical to continue rail transportation of the raw energy to the load center than to transmit electrical energy from this spot to the same load center. The chart assumes that the applicable freight rates are those we have termed "representative." Using either the maximum or the minimum lines, or any line between, would show the same result.

A most important question is whether or not it is physically possible to locate a power plant of the size indicated at the mine mouth. There are power plants today so located. However, no single mine is now producing the more than 4,400,000 tons of coal a year required by the 1,800,000-kw generating station over its life. In addition, a big generating station requires a considerable land area and a suitable water supply that is seldom,

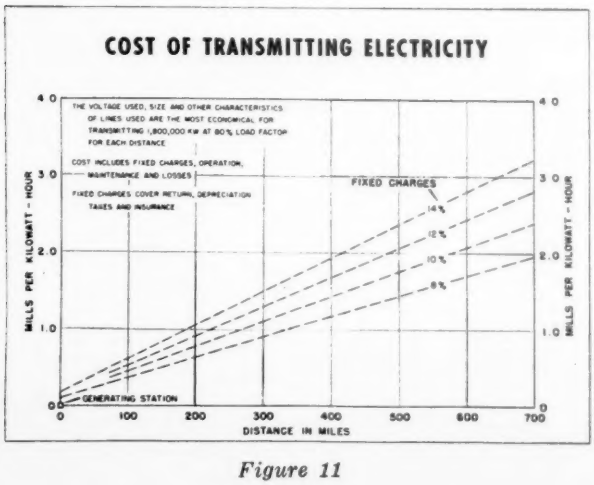

COST OF TRANSMITTING ELECTRICITY
THE VOLTAGE USED, SIZE AND OTHER CHARACTERISTICS OF LINES USED ARE THE MOST ECONOMICAL FOR TRANSMITTING 1,800,000 KW AT 80% LOAD FACTOR FOR EACH DISTANCE
COST INCLUDES FIXED CHARGES, OPERATION, MAINTENANCE AND LOSSES
FIXED CHARGES COVER RETURN, DEPRECIATION TAXES AND INSURANCE
FIXED CHARGES
14%
12%
10%
8%
GENERATING STATION
MILLS PER KILOWATT - HOUR
DISTANCE IN MILES

*Figure 11*

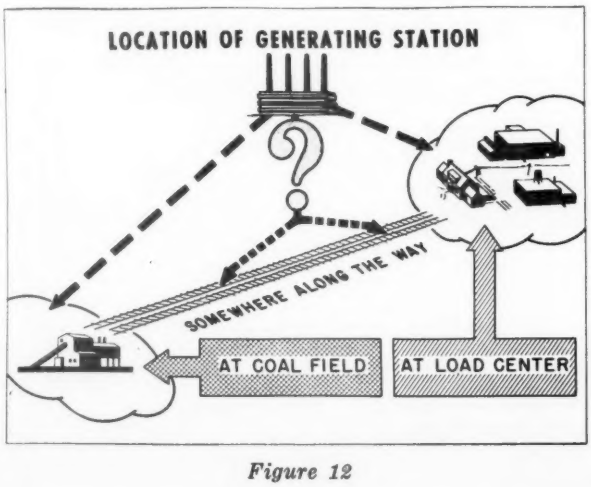



*Figure 12*

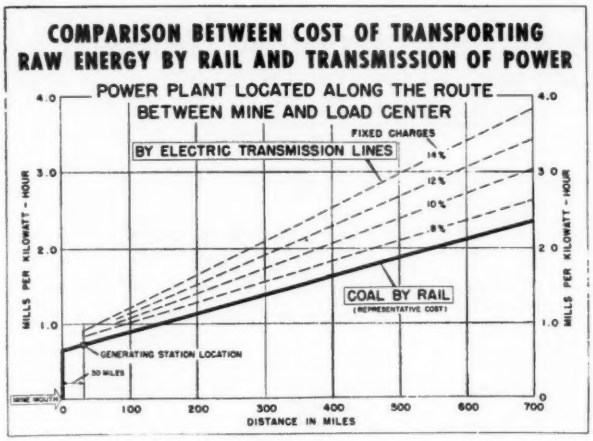



*Figure 13*

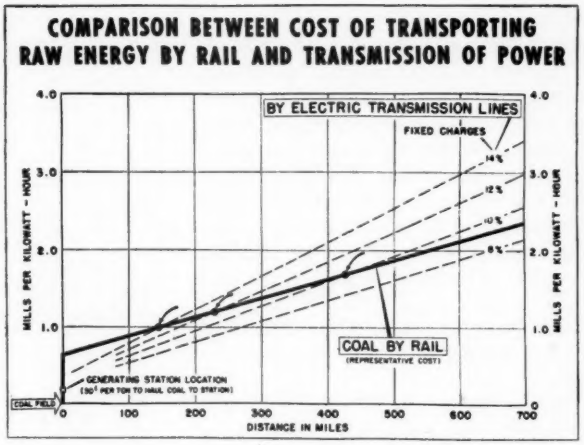



*Figure 14*

if ever, available right at the mine tipple.

We do believe, however, that a power station might be so located that coal could be taken to it from the mines by belt conveyors, trucks, mine cars, or other special means at a cost lower than indicated by standard railroad rates. It is even probable that favorable short-haul railroad rates might be negotiated.

Fig. 14 assumes that the generating station is so close to good coal mines that the cost of special transportation to it would be only 50 cents per ton of coal. Perhaps this is on the low side, but it will serve to illustrate.

For the representative freight rates we find that the "balancing" or maximum economic transmission distance would be about 150 miles for 14 per cent fixed charges, 230 miles with 12 per cent fixed charges, 430 miles with 10 per cent fixed charges, and over 700 miles with 8 per cent fixed charges. Evidently investment charges have a controlling effect upon the result.

When the freight rate "envelope" is substituted for the so-called representative rate (Fig. 15), it is apparent that the high side of the freight rate envelope would extend the economic transmission distance with 14 per cent fixed charges from 150 miles to about 330 miles, and with 12 per cent fixed charges from 230 miles to about 520 miles. Both the 10 per cent and 8 per cent fixed charges lines are below the top of the envelope.

On the low side of the freight rate envelope, railroad transportation is more economical for any of the transmission-line fixed charges, save the 8 per cent assumption. The use of that percentage shows a saving only for distances under 200 miles. I have read distances from the chart, but they, of course, are only approximate, as the short-haul rail distance is not always the same as the transmission distance.

Fig. 16 shows the effect of some variations from our primary study. As a basis for comparison, the stack on the left shows the maximum economic distance of our study for 12 per cent fixed charges and representative freight rates. Moving to the right, if the cost of getting the coal from the mines to the generating station in the coal field should be 75 cents instead of 50 cents per ton, the maximum economic transmission distance would drop to 180 miles. If the load factor should be 60 per cent instead of the 80 per cent used in the study, this alone would drop the maximum economic transmission distance to 100 miles. If a 900,000-kw generating station should be used instead of the 1,800,000-kw plant, the change would reduce the maximum economic transmission distance from 230 to 150 miles. And last, if the plant economy

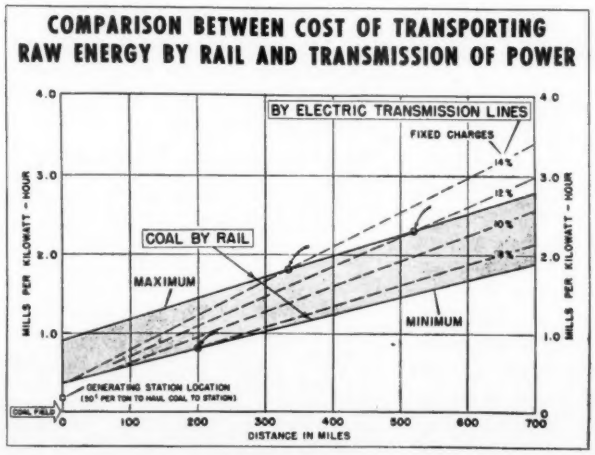



***Figure 15***

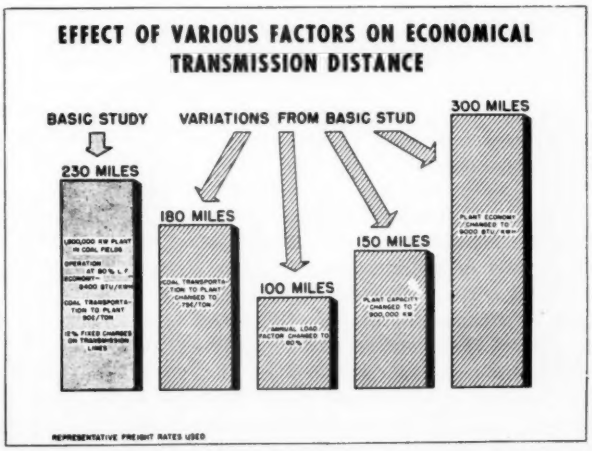



***Figure 16***

of the 1,800,000-kw station should be 9,000 Btu per kwhr instead of 8,400, more coal would have to be hauled, and the maximum economic transmission distance would become 300 miles.

Fig. 17 illustrates another variation from the basic study. The diagram on the top shows the maximum economic transmission distance for a 1,800,000-kw block of power as between locating a power plant of that size in the coal field, and locating it at a load center with a load large enough to utilize the entire output of the generating station.

But what would be the maximum economic distance if there were three interconnected load centers, each of about 600,000 kw? An alternative to the 1,800,000-kw power plant in the coal field would consist of two-unit power plants, each of 600,000 kw, located at the three load centers, labeled A, B, and C, plus strengthening of existing interconnections. These smaller units would be consistent in performance with the 450,000-kw units in the coal field station.

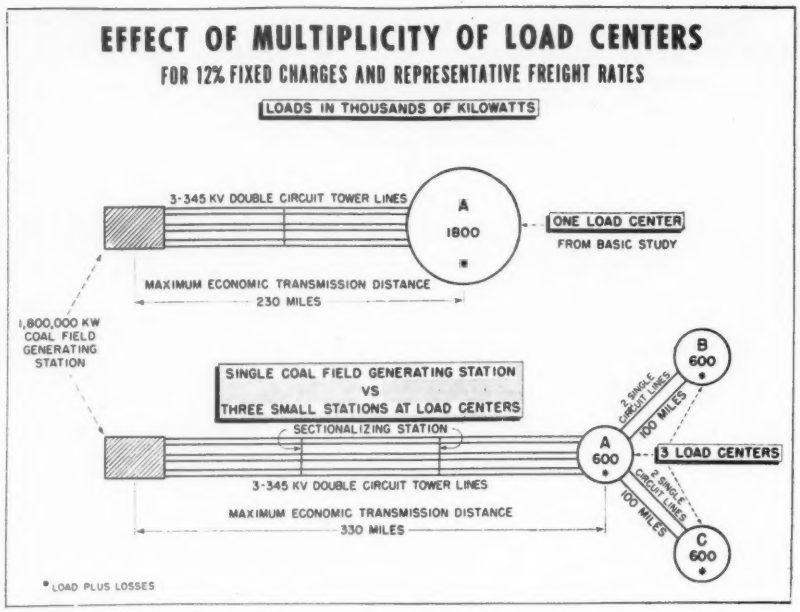



*Figure 17*

When this example is worked through, we find that the maximum economic transmission distance from the coal field power plant to Point A has been increased to 330 miles, an increase of 100 miles over the distance developed in the basic study. There are, of course, other alternatives. If the individual plants were three-unit plants containing 200,000-kw units, the maximum economic transmission distance to Point A would be increased beyond 330 miles.

The large deposits of lignite and other low Btu coals in this country are little used today. They may be an important factor in the future, especially when the extraction of by-products is further developed. A lignite-burning plant requires approximately twice as much fuel tonnage as a coal-burning plant. Currently, freight rates for lignite average about 80 per cent of freight rates for coal. Hence, the economic transmission distance would tend to be greater for a lignite-burning plant; however, should such a mass hauling business be in sight, the railroads affected might offer much more attractive rates than are now available. Furthermore, it should be remembered that construction of a lignite-burning plant, whether in the lignite fields or at the load center, will be justifiable only when conditions are sufficiently favorable to offset the advantages of the lower construction and operating costs and higher economy of a coal-burning plant.

No paper today would be complete without some mention of the atom. Obviously, if a generating plant using atomic fuel is to be tied to an atomic pile at some Federal installation, the transmission problem is analogous to that involved in the transmission of hydroelectric power to market. However, if the so-called breeder type of reactor is used, then the generating station could be at any acceptable location. The weight of the material (fuel, if you prefer that term) that goes into the breeder would be very much less than that of equivalent coal. It seems evident that transmission from the source of the atomic fuel could not compete with transportation of the raw energy by rail to the load center.

In drawing conclusions from the material presented herein, a word of caution is necessary. We have covered but one phase of a very complex subject by using comparable basic figures. Though these figures are for the transportation of very large blocks of energy, they can be adjusted for application to situations of different magnitudes. When a specific situation is under consideration, every factor bearing upon its economic solution should be included, and equated to the common base. Individual results may differ widely from the general conclusions which we have reached, and which are as follows:

1. The economic advantages of large generating units installed in stations of great capacity are so important that their use is indicated wherever load concentrations permit.

2. The main reliance to meet future load growth will be in steam-electric stations using coal, and lignite to a limited extent, as their primary fuel.

3. Long-distance transmission cannot be justified economically unless the generating station is located, in effect, at mine-mouth with an assured long-term, low-cost, raw fuel supply.

4. The unit costs of transmitting energy electrically are lowered where large blocks of power are to be moved. This factor, combined with high load-factor loadings, tends to bring electric transmission and transportation of raw fuel into closer competition.

5. Where long-distance transmission is indicated, rail competition and the financing costs of the transmission lines determine the balancing economics.

6. The use of types of financing similar to those employed by groups

(*Continued on page* 286)

# The Industrial Development of Atomic Energy

**Gordon Dean**

*Chairman, United States Atomic Energy Commission*

An address before the Twenty-First Annual Convention of the Edison Electric Institute, Atlantic City, N. J., June 4, 1953

THE atomic energy program at present is one of the largest single consumers of electric energy in the United States. It is one of the main objectives of the Atomic Energy Commission and of foresighted industrial leaders to reverse this situation. One of the more important questions of our time, as a matter of fact, is just how our progress toward this worthy goal might be speeded.

There seems to be no doubt that economically feasible power from the atom can be achieved. The only doubt that exists has to do with such questions as "when" and "how." And the "how" has more to do with policy than it does with technology. The scientists and technicians have some clear ideas as to what needs to be done. But the policy makers have not yet laid down the ground rules under which it will be done. In a very real sense, therefore, we are at a crossroads in the matter of atomic power policy. I think it might be helpful, as background, to mention just a few of the technical milestones we have passed in arriving at this crossroads.

First, of course, was the initial successful operation of a nuclear chain reactor. This was accomplished on December 2, 1942, by Enrico Fermi and his staff at the Metallurgical Laboratory at the University of Chicago. This experiment, which was preceded by some important work at Columbia University in which Dr. John Dunning played a leading role, proved beyond any doubt that a nuclear chain reaction could be made to sustain itself, and that it potentially was capable of releasing great quantities of energy which would appear in the form of heat.

### Useful Power Produced

Another important milestone was the first successful production of useful atomic power. This was accomplished in December, 1951, in a machine known as the experimental breeder reactor, which had been constructed at the Commission's Reactor Testing Station in Idaho by the Argonne National Laboratory, successor to the war-time Metallurgical Laboratory. The machine was designed and developed by the laboratory's capable staff, including particularly Dr. Walter Zinn, its director, and Dr. Harold Lichtenberger.

GORDON DEAN

### Generating Electricity

The amount of useful power produced by the experimental breeder reactor is not significant, and it is being done only as a research experiment, but it has proved beyond any doubt that the heat generated by a nuclear reaction can be taken out and put to work generating electricity. More recently, if added evidence were needed, another machine with a different basic design has also produced useful electric power. This is the homogeneous reactor experiment at Oak Ridge.

The third milestone, as I see it, occurred last summer, when reports were turned into the Commission by the four industrial study teams which had been examining the status of the Commission's reactor development program for the previous year. These teams, of which The Detroit Edison Co. together with the Dow Chemical Co. constituted one, had been permitted into the Commission's laboratories and plants (after appropriate security clearance) to see, among other things, whether they thought the development of economically feasible atomic power was possible. I will not go into the details of these reports here; non-secret versions of them are available elsewhere. But the important thing to remember is that none of them was pessimistic so far as the ultimate practicability of atomic power is concerned. This encouraging judgment on the part of experts from outside the atomic energy program itself has lent a good deal of impetus to the drive to achieve economical power.

The fourth major milestone occurred earlier this year when the prototype of the first atomic power plant for submarine propulsion began operating at the Reactor Testing Station in Idaho. This is a significant reactor, for it is the first one specifically designed to produce useful atomic power for a real, practical purpose, that of producing steam to turn a propeller shaft. It isn't economical power, in the commercial sense of the word, but it is real atomic power, and it is going to be put to work to do a job that cannot be done as well by any other means. When the seagoing model of this reactor first turns the screw of the USS Nautilus, probably next year, atomic power will have come of age.

### Vision of the Future

All of these milestones have combined to show us that atomic power can be produced, that it can be produced to serve a practical purpose, and that it almost without doubt can ultimately be produced to serve a practical purpose at costs that can compete with those of coal, gas, and oil. It is not surprising that these same factors have also combined to stimulate visions in our minds of a future in which atomic power plants and propulsion engines will add an

enormous new source of energy to the world's dwindling supplies of conventional fuels.

But in the past this vision has been clouded a bit by the relative scarcity of the fuels that are known as fissionable fuels, upon which power-producing chain reactions must feed. In this connection, I have the great pleasure to announce that we have now reached still another milestone in the history of atomic energy development in this country. It is a development which holds out the promise of making a civilian atomic power industry even more feasible and attractive in the long range than it has hitherto appeared to be.

### Illustrative Analogy

To explain to you the impact of reaching this new milestone, I would like to use an analogy, albeit a greatly over-simplified one. I would like to ask you to imagine a world in which only 100 gallons of gasoline existed. When that gasoline was used up, gasoline would forever be gone from the earth. But let us imagine that we could make gasoline out of water by burning the gasoline we had in the presence of water. Let us say, for example, that by burning up our 100 gallons of gasoline we could change 90 gallons of water into new gasoline, and that thereafter we could, by burning gasoline in the presence of water, always make new gasoline equivalent to 90 per cent of that which we burned. By such a process we could quite obviously greatly stretch out our supply of gasoline, but we could hardly expect to stretch it out indefinitely for we would always be making a little less gasoline than we consumed. Ultimately we would run out of gasoline before we ran out of water, and all the rest of the water in the world would be useless to us so far as gasoline production was concerned.

But to pursue our over-simplified analogy still further, now let us assume that we succeeded in developing a way by which we could produce 100 or more gallons of new gasoline from water for every 100 gallons we burned. Suddenly we would have made it possible to change gradually all of the water in the world into gasoline. Our gasoline shortage would have vanished.

Scientists have known for a long time that something roughly analogous to this is theoretically possible in the field of atomic energy. In atomic energy, there is only one fissionable fuel that occurs in nature. It is called Uranium-235, and it unfortunately constitutes less than 1 per cent of normal, natural uranium. The supply of it that can be obtained from economically mineable deposits is limited. But the scientists have also known for a long time how to change another, much more prevalent, kind of uranium into fuel by burning Uranium-235 in its presence. They have also known that they could change thorium, another relatively plentiful element, into atomic fuel by the same process. But they have never been quite sure that this fuel production process could be done in such a way that as much or more new fuel would be created as there was old fuel consumed. They thought it could be done, and they even had a name for it. They called it "breeding," and it was in an effort to find out for certain whether this breeding process was possible in a particular type of reactor that the Argonne National Laboratory designed and built the experimental breeder reactor in Idaho.

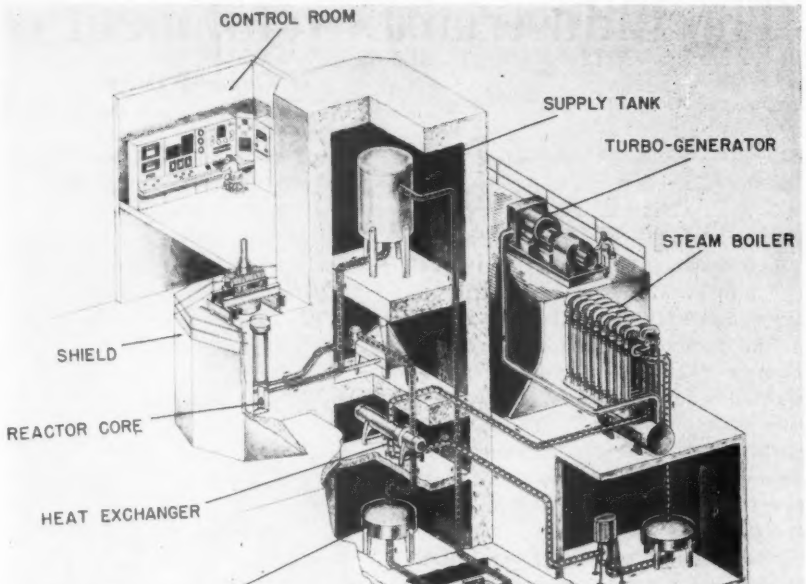



*Fig. 1—Diagram Issued by Atomic Energy Commission Showing How Experimental Breeder Reactor Works.*

This, you will recall, is the same reactor that first produced atomic power in 1951. I now have word that Dr. Zinn, Dr. Lichtenberger and their Argonne colleagues have used the reactor to demonstrate successfully the principle of breeding. The reactor is operating in such a way that it is burning up Uranium-235 and, in the process, it is changing non-fissionable uranium into fissionable plutonium at a rate that is at least equal to the rate at which the Uranium-235 is being consumed. Breeding has been achieved, and Dr. Zinn and his colleagues are to be congratulated for bringing us to another important milestone in the development of atomic energy.

I think, however, that we must take care to see that this encouraging development is kept in its proper perspective. This news does not mean that economic power from atomic fuels is here. It does not mean that overnight we have suddenly obtained all the fissionable material we want or need. It does not mean that uranium can now be regarded as a virtually costless fuel. It is quite possible that the breeding principle will not even be incorporated in the first atomic power plants. It may be that

some other types will be more feasible from the economic point of view, at least at first and possibly for some time. A large-scale breeder reactor can be a costly proposition. It requires a very large initial investment of scarce fissionable fuel. In addition, before the newly created fuel can be extracted and put to use, it must go through a chemical separation process which is currently one of the most expensive aspects of the atomic energy business.

The achievement of breeding also does not mean that we are suddenly independent of raw uranium ore. Far from it. Breeding is a slow process, and a reactor may have to operate for five years or longer before it succeeds in yielding as much new fuel as was initially invested in it. Our great current demand for Uranium-235 and plutonium for weapons, and our equally great need for raw uranium ore to meet this demand, will not be lessened one iota.

### Utilization of All Uranium

The real significance of breeding is that it is now possible for mankind ultimately to utilize all of the uranium that can be extracted from the earth's surface for atomic fuel, whether it is fissionable or not in its natural state. The proof of success in breeding at the Idaho station suggests, in addition, that the other potential atomic fuel, thorium, may also ultimately be utilized. Thorium, however, was not used in this particular experiment, and I do not wish to imply that its susceptibility to breeding has been proved.

In summary, I should like to emphasize that the achievement of breeding with uranium is an important event, but it is not one that is likely to cause any immediate, or even imminent, revolutionary change in the economics of atomic power production. What it constitutes, mainly, is another encouraging and important factor which can be introduced into the many calculations being made to determine the best technical and economic approach to real, competitive atomic power.

All of these factors, and a great many more besides, have combined to bring us to the crossroads in atomic power policy that we have now reached. The last remaining technical obstacle is to learn how to build atomic power plants so cheaply that the power they produce will be competitive with that from conventional fuels. The policy problem that faces us is to determine how this cost-cutting job can best be done.

As you probably know, the Atomic Energy Commission has some ideas on this subject. They were made public last week by the Joint Congressional Committee on Atomic Energy, to whom we had given them in response to their request. But before we consider these, let us consider for a moment the national policies under which most of the technical milestones I have just mentioned have been reached. These policies are laid down in the Atomic Energy Act of 1946, which established the Atomic Energy Commission.

This law, among other things, gives the Commission a complete monopoly in the field of atomic energy. Under the law, for example, no one but the Commission may own fissionable material and no one but the Commission may own any facility in which such material is produced. In addition, no one may sell or ship any of the minerals from which fissionable materials can be produced except with the consent of the Commission, and no one may own a patent having to do with the production of fissionable material. The Commission also has complete control of all information developed in the field of atomic energy, and there are stiff penalties in the law to make sure that this information doesn't find its way into hands not approved by the Commission. All in all, it is a strong law, and the powers it grants to the Commission are broader, or at least as broad, as any ever given a Federal agency.

This law has been a good law. Under it the atomic weapons program of this country has gone forward at a truly impressive rate, and the technical milestones in the power field that I have mentioned have been achieved. But now, the Commission feels, the law should be modified. The ground rules under which atomic power research is carried on in this country should, in the opinion of the Commission, be changed. There are several reasons why we feel this way.

First, nearly everything that has been done in the nuclear reactor field until now has been done for a government reason. The government has developed reactors to produce plutonium for bombs, to serve as government research tools, and to propel submarines. It also has other projects underway which will lead ultimately to the propulsion of aircraft and large surface ships. But all of these projects have been undertaken to meet a need or a demand that had generated within the government. Now, however, there is good reason to believe that a demand outside of the government's own sphere of operations is developing for atomic reactors. It is a commercial demand, an economic demand, and a civilian demand. It seems only reasonable to expect that people outside of the government be given a chance to work toward the development of reactors to meet this demand.

### Developmental Job

Another reason why the Commission feels that the present ground rules should be changed is because the job ahead is a developmental one, a cost-cutting one, the kind of a job that can be done best by skilled people competing with other skilled people who are working toward the same or a similar goal. In other words, it is the kind of a race for which one wants as many starters as possible, and you can't recruit many starters for this kind of a race under the ground rules laid down by the Atomic Energy Act of 1946.

As a result, the Commission has, since last September, been giving some very serious thought to what there should be in the way of new ground rules. We have developed a policy position which is the result of a lot of careful thought and deliberation. Our position is that the present Federal monopoly should be relaxed to permit wider participation in the power reactor program. To accomplish this we have proposed that the present law be amended to permit:

1. The ownership and operation of nuclear power facilities by groups other than the Commission.

2. The lease or sale of fissionable material under safeguards adequate to assure the national security.

3. The use and transfer of fissionable or by-product materials by the owners of reactors, subject

to purchase by the Commission or regulation by the Commission in the interest of health and safety.

The purpose of these changes in the law is to encourage groups outside of the Commission to invest money and talent in the development of economic power reactors. It is obvious, we think, that if we want people other than ourselves to invest money and talent in the development of these facilities, we must allow them to own or lease the facilities, fuels, and the by-products, subject, naturally, to appropriate controls.

As part of its policy position, the Commission has also proposed that the suggested changes in the law be accompanied by adjustments in the Commission's own practices to permit:

1. As appropriate, the granting of more liberal patent rights in accordance with existing law.
2. A progressively more liberalized information policy in the power reactor field, as justified by need and as permitted by security considerations.
3. The performance in Commission laboratories of such research and development work in the power field as is deemed warranted in the national interest.

The Commission also promised in its policy statement to give consideration to a progressively adjusted safety code to keep pace with operational experience with reactors.

The purpose of all of these proposals is not to attempt to create a new, crystallized environment in which one might expect an atomic power industry to come into being and flourish forever. It is not yet the time to attempt anything like that. In my opinion, the next five years are developmental years, years in which we will be working toward the realization of economically feasible atomic power, not enjoying its fruits.

Our purpose is to create a temporary environment in which this developmental effort can be expected to go forward, a period in which the Commission is given the power and discretion to encourage the participation of others by granting them certain rights which they now cannot have no matter how much money or how much effort they put into this kind of work.

I have noted with considerable interest and some disappointment that a few people have already labeled these policy recommendations as "the atomic giveaway program." This is simply not true. It is not a giveaway program; it is not even a sell-away program. Under it the Commission gives nothing away. It doesn't even sell any of its own facilities. All it would do would be to permit others to own what they themselves have built and paid for, or, in the case of materials, bought and paid for, or manufactured. It seems ridiculous to me for one agency of the Federal government to attempt to exclude others forever from a promising new field whose main significance will be to the overall economy, not to any particular segment of it.

### Establishing Ground Rules

This policy statement by the Commission is an attempt to set up ground rules which are the same for everybody, and when I say everybody I mean Federal agencies, state agencies, municipal agencies, and private industry. Everybody who has something to offer to the development of atomic power should be allowed to make a contribution to that development. The idea that some people apparently have that the Federal government of this country and the private industries of this country represent two separate and sovereign powers is, in my opinion, most unfortunate. There is only one sovereign power in the country, and that is the Federal government. I think it can be relied upon to see that this new force called atomic energy will always be controlled in the public interest, and not, I hope, by monomoplistic management but by regulation, and leadership, and the stimulation of competition.

I think that those who have labeled these proposals as a "giveaway program" have not read them as carefully as they might. Actually, there is only one place where any real rights of the government are at issue in the development of atomic power, and that is in the matter of patents. And yet, if you will look at the Commission's policy statement carefully you will find that it has talked about patents only in the most general terms. In its list of proposed steps, this is what the statement says about patents: "More liberal patent rights than are presently granted to outside groups as may seem appropriate to the Commission and consistent with existing law." You will notice that the statement says "consistent with existing law." The Commission all along has interpreted the patent provisions of the existing law very rigidly so far as the government's rights are concerned. Present policies can be relaxed to some extent without any change in the law, and therefore without any change in the overall national policy on the subject of atomic energy patents.

As of now, the Commission has not proposed any change in the patent provisions of the law. This does not mean that it might not do so later. This question is now under careful study. In this regard, I think there are two objectives:

1. I don't think anyone should be allowed to come into the atomic power picture with the investment of a dollar or two and walk off with patents worth hundreds of millions of dollars.
2. I think people who come into the power program and make a real contribution based on a liberal investment of talent and money, involving a real risk, should be entitled to some patent rights denied to others.

This all boils down to a question of fair play and common sense. I think it is obvious that we cannot expect private concerns to come in and spend millions of dollars without getting some benefits, and I think it is obvious that private concerns as well as the government must be in this power program. Otherwise we can never have real competition, the catalytic agent of progress, and we will always have a program limited in size and scope by the range of the Federal government's imagination and vision, which is not always as broad as it might be.

During the developmental period we are moving into, I am convinced that industry and government must work together if we are to get the most out of it. During this period, it seems clear to me that some prototypes and pilot plants of atomic power facilities must be built. It is my own opinion that the government, as well as industry, must participate in this

kind of endeavor, for as of today the investments must be high and the pay-offs a number of years in the future. I would be very pleasantly surprised if private capital were to move in and pick up the total check for this expensive and, at first, unprofitable work. I noticed the other day where the North American Aviation Co. announced that it had developed a power pilot plant which they were ready to build for any customer at a cost of $10,000,000. It will be interesting to see if this company has any takers in private industry, even if the law is revised. I have my hopes, but I also have my doubts.

There is one rather fundamental question which I have not touched upon in these remarks, but which has been asked me several times in the past few days, notably by a member of Congress. It is an interesting and provocative question. It is this: "Why, exactly, are we interested in achieving economically feasible power from the atom?" When I was first asked this question I was a little surprised, for I had always assumed, for reasons not too clearly spelled out, that no one could quarrel with such an objective. I had assumed it was agreed upon by everyone.

One answer to this question, of course, is that we want atomic power because there is a demand for it, and that we know this because of the intense interest demonstrated by so many industries and businesses in it. One might extend this line of reasoning and conclude that if there is a demand for atomic power, it must be worth going after.

But this is hardly a national policy reason for pushing toward the early development of an atomic power industry in this country. A good national policy reason would be provided, of course, if we were on the verge of running out of coal, oil, or gas in a year or two. But we are not. This may be true of others, but it is not true of the United States.

Why, then, do we want atomic power? I think we want atomic power because as soon as it comes into being it will reduce the rate at which we are using up our other natural resources. It will release them for other uses or permit us to conserve them for future specialized use.

I think we want atomic power because our demand for energy in this country and in the world is increasing at an enormous rate, and the costs of producing such fuels as oil and gas will steadily rise as the supplies dwindle. We will need a supplementary source of energy, and to be ready when the time comes we must push ahead now.

I think also that we need atomic power because atomic fuels are virtually weightless fuels. They can be taken anywhere in the world—to the source of raw materials upon which industries are based, to deserts, to mountains, and to islands.

I think we need atomic power so that we may help our friends in the world who are in need of new resources of power. I have particularly in mind those who have been and are supplying us with the uranium with which we are feeding our weapons program.

And I think we need atomic power because no one really knows the enormous impact this new source of energy may have on our economy and our mode of life. I have heard that there were people who asked Henry Ford, "Why do we need the automobile when we we can get where we're going quicker on a horse?" Right now our objective is to advance our atomic power technology to the point where it can compete with the "horse" that is coal, gas, and oil. But that is just the beginning. I know, and I think we all know, that there is more in the atom than that.

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# President's Initials Stand for "Kentucky Colonel"

*An Ohio electric company explains an old Kentucky commission in the following article, reprinted from our contemporary,* Forward, *published by The Dayton Power and Light Co.*

WE don't know what Governor Frank J. Lausche said to Governor Lawrence W. Wetherby of Kentucky, but we recently discovered we have a Kentucky Colonel in our midst commissioned by the Governor of Kentucky in the person of Kenneth C. Long, President of our company.

The Honorable Order of Kentucky Colonels is confusing and uncertain to many people, there being numerous conceptions and some rather positive statements as to its origin.

On delving into the records of Kentucky, we find the first Kentucky Colonel commission was granted 161 years ago when Kentucky's first governor, the Honorable Governor Isaac Shelby, was elected to office in 1792.

The Kentucky Colonel is commissioned on the Governor's Staff as an Aide de Camp but does not lose his title at the end of the commissioning Governor's term of office. He has no duties but it is to be expected that he will continue to promote the welfare of Kentucky.

Recipients of the award have always been proud of the title conferred upon them as it was conceded to be a mark of distinction held only by those who had unselfishly given of their time and talents for the betterment of Kentucky. Throughout the years many outstanding citizens were thusly honored and as time wore on the distinction increased.

There is but one stated and important meeting of the Order each year and that is held Derby eve, in Louisville, Ky., at the Brown Hotel. Guests are served a sumptuous meal of favored southern dishes in the traditional hospitable Kentucky manner.

It is to be understood that commissions are not restricted to Kentuckians. Many notable citizens from many states in the Union are holders of this coveted award and title.

The accompanying poem, written by Colonel R. W. Wilson, typifies the character of the historic Kentucky Colonel.

*A smile and a 'Howdy' is his salute,*
*He's a gentleman clear from his hat to his boot.*
*A mustache, perhaps—but a glint in his eye,*
*And sometimes maybe the little string tie.*
*A highball in temperance, a julep at leisure,*
*A man who enjoys both business and pleasure.*
*A man who's inspired by the Thoroughbred Journal,*
*I'm referring to 'Suh'—*
*"The Kentucky Colonel."*
Congratulations—Suh!

# Broad Aspects of Use of Atomic Energy for Generation of Electric Power

**Dr. John R. Dunning**
*Dean of Engineering, Columbia University*

An address before the Twenty-First Annual Convention of the Edison Electric Institute, Atlantic City, N. J., June 4, 1953

ORIGINAL interest in the field of atomic science may be traced far back into history, as far as the Greeks, in fact. But it was not until late in the 19th century that the whole field began to open up. From there we trace it to 1939, roughly, when the first fissions were observed, and it may be traced past a series of milestones since that time.

This whole succession of events demonstrates clearly that there is enormous energy locked in the atomic nucleus; that this energy, in the form of cohesion between these elementary particles, can be triggered off; that it can be made to chain-react and to maintain itself continuously; and that a practical source of power can be the result.

DR. JOHN R. DUNNING

### Steps in Breeding

Let us now reconsider, for a moment, the steps in achieving breeding, net gain breeding, and what these steps really mean in terms of the practical development of power. The production of radioactive isotopes is a very valuable and important step in our research. In terms of the uranium fission fragments (which fly apart violently when neutrons hit Uranium-235), an order of 90 per cent of that energy is liberated instantaneously. It is an exceedingly high-level energy release, of somewhat under 200,000,000 electron volts, compared to ordinary chemical reactions, such as those combining carbon with oxygen when coal is burned in a modern power plant, of around 2 electron volts on the same basis. This is degenerated into heat almost immediately. The fission products, the "ashes" of nuclear combustion, as radioisotopes, represent only a small portion of the total energy and, while they have a whole series of interesting applications, ranging from agriculture through basic research in everything from the metal industry to medicine, to cancer therapy, and even perhaps to chemical processing, the total energy involved is small, percentage-wise. The fact that roughly 90 per cent of the energy appears almost instantly in the form of heat means that the industries which utilize heat will be the ones which can really profit and enlarge their operation by the use of this phenomenon.

I am sure the Atomic Energy Commission will allow us to say that somewhere above two, two and a half, or perhaps approaching three secondary neutrons are given off each time a primary neutron fissions a Uranium-235 or plutonium nucleus or other fissionable fuel nucleus. The key to the practical large-scale utilization of atomic energy on an economic basis is this fact that between two and three secondary neutrons are given off each time a primary neutron causes fission. This means that not only is the chain reaction maintained, liberating energy, but, depending on our effectiveness in utilizing these secondary neutrons in a practical and industrial economic way, there is the possibility of producing more new synthetic fuel, more by-products, as it were, than we actually burn.

This has been clear in principle for a great many years. The significant point of the first prototype breeder reactors at Arco, Ida., is that, in this intermediate-size unit, some net-gain breeding has been achieved. This is indeed a milestone.

However, we are faced with the problem of a major practical engineering development, if this is to be of real significance in the electric power generation field. It is clear that we are confronted with a development program which is "X" years, perhaps three, five, perhaps more ahead. This much time will surely be necessary to establish engineering practicality on a large scale, the economic bases, performance, capital investment required, and long term maintenance and operating costs. Only then will the range of possibilities involved be realized.

### Underlying Factors

Let us look back again for a moment to see what underlies this in terms of the phenomena and the fuel, so that we may more intelligently forecast what this five-, 10-, or 20-year period may mean. Unfortunately, none of us can see into next week, let alone next month, next year, or the next decade, but historical perspective normally gives us a chance to project approximately where we may go as we move along.

In Fig. 1, the primary neutron hits the U-235, causes fission, and the two fragments fly apart violently. To carry on a chain reaction, on the average, one secondary neutron must proceed on, hit more U-235 and cause an additional fission. We must always allow for the loss of some fraction of the neutrons, by escape or by

capture, in any practical power reactor system, but by minimizing this fraction we can have, in principle, a net gain of some fraction of the secondary neutrons, above one per fission, which may go on to be useful for by-product purposes—bombarding fertile materials such as U-238 or Thorium-232 and producing, in turn, as end products the synthetic isotopes, Pu-239 or U-233. Thus, for each U-235 full atom burned we can produce more than one new fuel atom.

The whole question of a net-gain power-breeder in this process is reduced to how well, in terms of practical engineering design, we can allow for all these possibilities and still have a net gain producing more synthetic fuel than we burn. We must, in the end, have this quantity —called "g" here—greater than zero. Anything in excess of that means that we have achieved success, if we have a practical, and thoroughly proven, power system based on this general process.

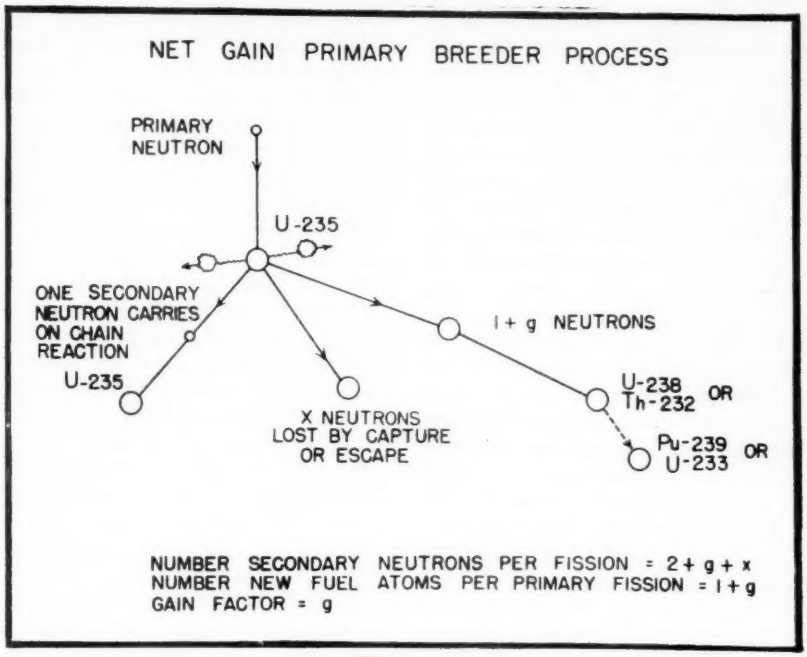
NET GAIN PRIMARY BREEDER PROCESS
PRIMARY NEUTRON
U-235
ONE SECONDARY NEUTRON CARRIES ON CHAIN REACTION
U-235
1 + g NEUTRONS
U-238 OR Th-232
X NEUTRONS LOST BY CAPTURE OR ESCAPE
Pu-239 OR U-233
NUMBER SECONDARY NEUTRONS PER FISSION = 2 + g + x
NUMBER NEW FUEL ATOMS PER PRIMARY FISSION = 1 + g
GAIN FACTOR = g

*Figure 1*

### Nuclear Power Plants

It might be well now to take a basic look at nuclear power plants from a process-flow chart standpoint. The nuclear reactor system is shown in Fig. 2 (in generalized form) as an integrated system in which, obviously, there is an exceedingly broad range of technical possibilities. We have proven breeding, and we have produced some power, but we are a long distance from maximizing, or optimizing the whole situation in terms of capital investment, economic performance, and long operating life for the purposes of the electric industry.

Any nuclear reactor is characterized by the feed going into it, which may be U-235, secondary plutonium, or possibly U-233—plus a fertile material—U-233, Thorium-232, or even future isotopes which have not yet been discovered. The nuclear reactor itself may be designed in a number of ways, of which the relative advantages and disadvantages still are not quantitatively demonstrated. The nuclear fuel may be in such forms as rods, tubes, discs, or flat plates, in a so-called heterogeneous type of reactor. In the so-called homogeneous type of reactor the fuel may be distributed as compounds in solution, or as physical mixtures in suspensions, but it must be there in some form.

For power utilization (which goes off to the right), clearly the energy developed in the reactor must be conveyed out. Here, again, we have a whole range of possibilities. As provided for in some reactor designs, ordinary water may be used as a coolant heat-exchange liquid, in line with conventional power plant practice. Heavy water, $D_2O$, also has some nuclear advantages and has its proponents, although the cost is high.

A nuclear reactor may be designed, using various amounts, forms, distributions, and kinds of materials

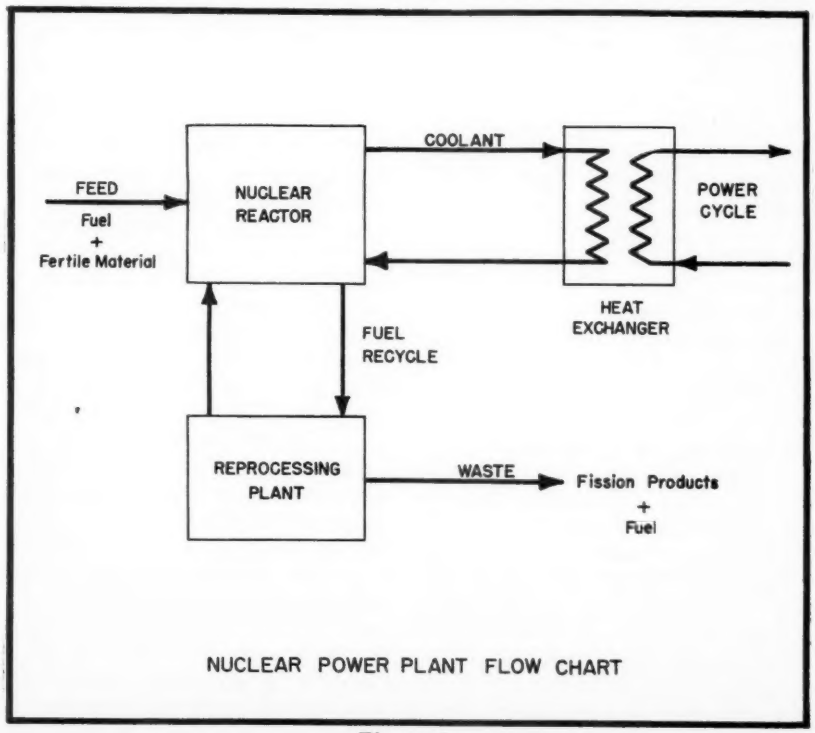


*Figure 2*

as moderators, which "slow down" the comparatively high energy secondary fission neutrons. If large amounts of low atomic weight materials are present, the fast neutrons are slowed down largely to ordinary thermal energies and the reactor is said to be a "thermal" reactor. If comparatively small amounts of materials are present and largely of higher atomic weight (whether as moderator coolant or other construction materials), the neutrons are slowed down comparatively little and the reactor is said to be a "fast" reactor. With intermediate amounts and types of materials, the neutrons are only partially slowed down and the reactor is usually called an "intermediate" reactor. There are advantages and disadvantages in all types regarding nuclear fuel inventory required, breeding gain achieved, heat transfer problems, and so forth. While the large AEC program has thus far clarified many of these questions, much still remains to be done before optimized and thoroughly tested engineering designs for particlar power plant applications finally can be crystallized.

### Liquid Coolant

The coolant may also be liquid molten metal such as the sodium-potassium alloy mixtures which are liquid at ordinary temperatures, molten sodium itself, or some higher melting point metals. Liquid-metals heat-transfer fluids have many strong proponents because of the exceedingly high heat-exchange rates which can be obtained. Such transfer rates can be so great that a nuclear reactor about the size of a rain barrel, as one man has put it, in principle can give enough heat transfer to power a 1,000,000-kw station. This is not an idle speculation. While heat has not been taken out at that rate as yet in a full scale unit of such a size, there are possibilities which will very well be realized one day, even though in eventual designs some compromises may be desirable. In any case, to isolate the radiation problems, most agree that a "double heat exchange system" is desirable.

There is a third phase to this—the utilization of thermal heat in the power cycle (the top line at right in Fig. 1) where we have the whole series of possible conventional systems. Ordinary steam systems or ordinary steam turbines with water as the working fluid may be used. Utilization of gas turbines, a whole developing field of great promise, is another possibility. Essentially all we are doing in a nuclear power system is substituting the nuclear fuel for the coal, oil, or gas fuels in use today in so many kinds of applications.

The reprocessing plant shown on the lower part of Fig. 2 illustrates another phase of a nuclear power system which is comparable to the present ash-removal systems of conventional power plants but is a good deal more involved. In every nuclear plant we burn a certain amount of nuclear fuel, and we have the fission products, the ashes of combustion. In solid fuel elements the "ash" is built up inside the fuel and tends to inhibit nuclear combustion. In addition, solid fuel elements are subject to radiation deterioration as are other materials of reactor core construction where the radiation density is high. This problem of deterioration of materials subject to nuclear radiation is a new one which needs further study, but success thus far strongly indicates that it can be solved adequately for long-life power-plant use.

### Continuous Reprocessing

In any case we must allow for a reprocessing of the fuel. In many types of reactors the burn-down, i. e., the fraction of fuel that can be consumed, is measured in small percentages of the total fuel present. In some reactor types there is a good possibility of burning a fair fraction of the nuclear fuel before one must reprocess. But there are many proponents who believe that the homogeneous reactor, which makes possible continuous reprocessing, has a very bright future. Under these circumstances the fission products, the ashes, can be removed continuously. Likewise, non-burned fuel may be recovered for reuse, and the simultaneous recovery of new synthetic fuel may be accomplished. Such products may be considered "waste," but in a larger sense, valuable waste. The fission products can be made available for wide range of utilization, and if breeding is successful, producing a net gain, we may also produce surplus fuel as "waste."

There are some groups who believe that reactors should emphasize primarily plutonium production only or power production only rather than attempt to maximize both simultaneously. There is likewise strong support for dual-purpose reactors producing both plutonium and power, as intermediate goals. In any case, both are likely to be stepping stones to the next phase to central power generation, which should at least have near unity breeding to achieve maximum economic advantage.

This concept of a nuclear power plant as an integrated system is much more important in the atomic power field that it is in conventional power plants. At the present time reprocessing plants are a considerable part of the expense. If we are to progress in this field, it is of the utmost importance, first, that the cost of nuclear reactors themselves be brought down considerably (we are now accustomed to think in terms of 20, 50 or even 100 million dollars for one reactor). Second, we must reorient our whole philosophy if nuclear power plants are to be successful economically and commercially, and most of us are very sure they can be. If the reactor is going to be in principle not the enormous firebox with the huge combustion space of the standard boiler system—which is largely open space—but rather simply a small, compact heat-exchange unit about the size of a "rain barrel," then clearly it should be very difficult to spend $10,000,000 on such a comparatively small device. Obviously, to talk of requiring ten or 20 million dollars for something this size is not good engineering, and our engineering must be on a much sounder basis.

### Minimum Fuel Inventory

Similarly, if one examines the magnitude of the huge atomic plants at Hanford or Savannah River and observes the size of the reprocessing plants (which in general are not truly closed cycle, as indicated in Fig. 2) one will see that these chemical plants associated with reactors represent a considerable fraction of the total cost at present. If we consider nuclear fuel in a basic sense, then one pound of uranium, as pure U-235, would be equivalent to around

1,300 to 1,500 tons of coal. For a nuclear reactor, the minimum fuel inventory—depending upon the kind of reactor that is used—is generally said to be from five to ten pounds for a thermal-type reactor, but for a fast neutron-type reactor the minimum fuel inventory must be a good deal higher in order for the reactor to be critical, to chain react, and to have all the other essential properties.

### Nuclear Fuel Costs

A small cube of solid uranium—equivalent to 1,500 tons of coal on a Btu content basis — costs roughly about $20 a gram as U-235, according to Gordon Dean's colleagues. This is, in effect, about $9,000 a pound. The comparative cost of such a cube of U-235 is, therefore, roughly equivalent to coal at $6 or $7 a ton. This price is not out of reasonable commercial range for many power applications, even though it is the most costly way we could utilize nuclear fuel as U-235 alone. Already the nuclear fuel cost is cheaper than aviation gasoline and comparable to some coal costs per Btu in various parts of this country at some distance from coal mines. It is a great tribute to the science and engineering and industry of this country that under the AEC nuclear fuels are now being produced on a large scale at such low costs.

Present nuclear fuel costs are in a reasonable range, and, indeed, for some applications to submarine propulsion units or ship propulsion units—and possibly in many types of mobile units where weight, fuel, logistics, or other factors are important —nuclear fuel cost is not excessive, and a whole range of possibilities of fairly economic utilization for special purposes opens up. As an example, a messenger boy might be sent with fuel to keep a ship or a city going or power conveyed to remote areas such as deserts or north polar regions! Nuclear fuel has economic and logistic possibilities that cannot be discounted even in pure form.

A much wider scope for use of nuclear fuels opens up when net gain breeding power plants are fully developed. The important point is that if we can go beyond U-235 as a pure fuel to utilize it with fertile materials to produce breeding, then our fuel costs picture becomes steadily more attractive. If we even achieve less than unity breeding, or perhaps get back only 80 per cent as much new, synthetic fuel produced as we burn of U-235, we have already achieved a good deal toward reducing fuel costs. This was indeed the case some time ago. But if we now can go over unity breeding and produce more new synthetic fuel than burned or even an amount equal to unity, new, comparatively expensive fuel material will not have to be fed into nuclear reactors. We have only, in effect, to feed the fertile material, the 140 times more abundant U-238 or thorium, and major reductions in effective fuel costs compared to coal become possible.

The whole development is essentially very simple and straight forward in principle. There is nothing complicated about it. The problem is to carry it out in a practical engineering way.

### A Laboratory Bench Operation

Major cost reductions in the reactor itself and the associated reprocessing plant are almost certainly possible. For example, many of us are convinced that the processing plant, which is at present exceedingly expensive, should be looked at in this light. The very largest single power plant conceivable will hardly burn more than one pound of pure U-235 a day. That is roughly equivalent to a 1,000,000-kw output operating continuously. This means that the fission products will weigh approximately .999 pounds, for we have converted one part in 1000 of the weight of this to energy if we completely burn it—that .999 pounds of fission products are produced each day which in a continuous system should be removed. I submit that a well-engineered system, requiring the removal of about this quantity of material each day, about a handful, should not take a half-mile-long plant as a standard operation. This should be more like the equivalent of a laboratory bench operation, though it must be exceedingly well shielded, and, admittedly, there are complicated problems that I have oversimplified.

I am approaching nuclear power systems from the other extreme, deliberately, to show that the engineering and design opportunities in this field are wide open. Mr. Dean would be the first to admit that. In fact, it was the whole thesis of his convention address that every phase of this atomic energy picture is one in which the experts of all types and all degrees have wide varieties of opinions. It is impossible to find any ten, 20, or 50 scientists and engineers who will agree completely on any one aspect of this. To me, however, this situation is exceedingly healthy, for it is the heart of the whole business. It means that we have myriad possibilities of utilizing the intrinsic energy in nuclear fuels already released in a number of different kinds of reactors, all of which have proponents. We have many design types in various drafting-board stages and in various people's minds, yet to be tried. All phases involved are wide open for ingenuity, invention, imagination.

Nuclear power has these great potentialities. A wise cooperation and wise balance between functions of government and functions of industry are absolutely essential in order to allow this whole field the opportunity of maturing. Above all, always remembering that proper control and regulations are necessary, we must free the ingenuity and the imagination of our scientists and engineers, whoever they may be, in whatever groups or organizations or industries or businesses, to exercise their genius and to put the money of their companies and their industries into their own ideas. In this way we are certain to find fertile ground for future advances.

### Progressive Movements

I do not mean to imply that every idea will be successful. I have certain opinions, some of which I am sure will prove wrong, just as I am sure that some of my colleagues in the engineering field will also be wrong at times. But wherever a situation so full of possibilities exists, somebody is sure to hit a jackpot here and there, and a whole series of progressive movements is certain to ensue.

It would be disastrous if it seemed that there were only one possible line of useful or successful investigation. Instead of this, we have a large number of potential power re-

actors, approaches, ways in which both thermal energy and the whole gamut of processing operations may arise, and out of these a whole industrial series of developments may prosper.

### Atomic Fuel Resources

Way back in 1935 or so when we began to talk about utilizing nuclear reactions, some of us were very optimistic. Since the war, after an initial period of foolish enthusiasm for a utopia tomorrow through atomic energy, many people have taken the optimists to task. For example, some have said there is not enough uranium in the world to make a reasonable-sized power economy based on nuclear fuels. Through the joint efforts of the commission and various individuals, aided perhaps by the incentive of competition in the international scene, the basic fuel situation and technical possibilities have been opened up. We are now no longer limited to an economy which does not include uranium as a potential fuel.

Walker Cisler may use figures indicating that there are probably at least factors of ten more nuclear fuel potential, compared to fossil fuels like coal or oil, in the world in materials such as U-235 and U-238 converted into plutonium or thorium into U-233. I believe, however, that today this even number must be taken as a figure of speech. The visible uranium and thorium supplies certainly resemble the "visible oil supplies" which, after Colonel Drake built the first oil well down in Pennsylvania roughly 100 years ago, people considered inadequate even to keep the lamps of this country burning. The oil supply was considered certainly too limited. Even though the visible oil supplies' exhaustion has been foreseen almost every ten or 20 years ahead since that period in the 1850's, still the actual oil supply available has continued to expand.

This does not mean that the total oil supply of the world is not limited. But if we apply the same thinking to uranium and if we have now uncovered as much uranium in this country and all over the world as is presently known to be in existence, then almost certainly, as we move forward into a uranium-powered economy, the supplies, the techniques for processing lower-grade ores, and the whole economics will improve steadily. If we can at this time talk in terms of having many times as much uranium per day in terms of Btu content as we have in terms of coal and oil, then almost certainly we will be even further ahead as we move into the next decades.

I believe sincerely that we have something about which we may conservatively be optimistic. Even now, compared to Mr. Cisler and the Dow-Detroit group, I can probably be considered a conservative for a change. As Mr. Dean has emphasized, we have demonstrated practical power generation and we have proven that we can have net gain breeding. What we must support over the next five- to ten-year period is a careful exploration of all possibilities: all the types of engineering and technical designs which will minimize capital costs and operation and maintenance costs. If we can talk in terms of U-235 being equivalent to coal at $6 or $7 a ton, very clearly actual fuel cost as part of total cost can be brought successively down as our progress toward and above unity breeding continues. Almost certainly capital costs, which have always been considered excessive and much larger than the cost of conventional power plants, we believe, could in principle be brought even below the cost of conventional power plants. This is possible because they should not require anything like as much volume as present-day power plants. The new heat-exchange methods, new processing methods, will almost certainly reduce these costs still further.

### Electric Industry Contributions

If the recommendations which Mr. Dean and the Commission have made for revision of the Atomic Energy Act of 1946 are adopted by Congress in substantially the form suggested, it will be possible for the electric industry to put its funds into this development in a more normal, business-like fashion. All of us who are involved on all sides, government and industry and in universities, have not only an enormous opportunity and a stake in nuclear energy, but also a deep responsibility as well. We must all work to realize the great potentialities that are clearly here for our economy and our national strength. There should be gains in a positive and constructive manner in every phase of our national life. Unless we are willing to accept this responsibility and this challenge and move forward to it, we will be derelict in our duty as citizens.

Our industrial economy, the production of energy and the by-product of fissionable fuel are symbols of our national strength. If we are to maximize our strength in this country, we need the imagination and the contributions of all those who have the ability and the opportunity to contribute.

One word of warning. While the future is conservatively hopeful, there is a long pull ahead. There is danger that the strong program of the AEC might be seriously cut and the progress of the nuclear energy field dangerously retarded in the expectation that industry would immediately pick up the development load. There will need to be major support by the government for a long time to come as industries gradually build up their development contributions. I hope we are wise enough to recogize the cooperative role that all must play.

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## Developments in Transporting Energy

*(Continued from page 276)*

of companies to provide the capital to construct large power plants and transmission lines to serve atomic plants would extend the limits of economic transmission distances.

Finally, the industries in the business of transporting raw fuels should be in position to meet the competition of long-distance electric transmission except for certain special conditions. On the other hand, electric companies must assure themselves as definitely as possible that transportation costs will not rise beyond economic balancing points in the near future because they, in effect, can secure long-time fixed rates by making the necessary transmission investments. This assurance is outside of the scope of engineering analysis. The course to be followed in each specific case will require business judgment of the highest order.

*The electric industry's responsibility in . . .*

# The Development of Atomic Energy as a Source of Electric Power

**Walker L. Cisler**
*President, The Detroit Edison Company*

An address before the Twenty-First Annual Convention of the Edison Electric Institute, Atlantic City, N. J., June 4, 1953

IN DISCUSSING potential use of atomic or nuclear fuels for generation of electric power and other heat energy requirements, I first wish to express appreciation for the vital part the Atomic Energy Commission, its members, and staff have had in bringing this new development to its present state in so relatively short a period. Theirs has been a great responsibility of which I believe our industry should well be conscious. It has been my privilege since 1947 to have seen much of this first hand, and it has been a pleasant and constructive opportunity for me personally, and I hope for others also.

The commission came into being in November, 1946, and on January 1, 1947, assumed a complex organization hurriedly built up as a wartime necessity and devoted almost entirely to military matters. And there were many both within and without that wartime group who then came under the commission's responsibility, who fervently believed that atomic energy development should continue under control of the military to preserve strict secrecy.

During intervening years, the commission has discharged its responsibilities wisely and well. It has recognized the fact that inevitably atomic energy must be an important factor in our industry and in our civilian lives, and it provided research facilities and carried on research toward that end.

Gordon Dean became chairman of the commission in July, 1950, following the four-year term of David Lilienthal. Under his capable guidance, earlier work begun by the initial commission has advanced rapidly toward the goal of peacetime industrial and civilian utilization. Today,

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radioisotopes are being used widely in many fields of endeavor—agriculture, medicine, metallurgy—and we are approaching the point where use of atomic fuels for generation of electric power may be accomplished on a competitive commercial basis.

Of greater significance, however, has been the realization by the commission that if atomic energy is to take its proper place in our industrial and civilian economy, then competitive industry must enter into the development and bring its vast capabilities into the effort. This position has been repeatedly announced by the commission and we understand that its recommendations for proposed amendments to the Atomic Energy Act toward this end have been presented to the Congressional Joint Committee on Atomic Energy. One bill to this effect was introduced in the House of Representatives on April 20.

We have been fortunate in the development of atomic energy—fortunate that we and not the enemy first perfected its use as a military weapon. We have been equally fortunate in the Atomic Energy Commission's wise action under leaders like Chairman Dean, who so well recognize our American way of life and the need to preserve and continue that way, even with such a controversial matter as atomic energy.

Presentations showing that nuclear fission had opened up a new source of heat energy appeared in the technical journals as early as 1938. These were based on experiments carried on over a long period by scientists in Europe and the United States.

Because of the extremely complicated processes involved in releasing that heat energy, and the secrecy which was imposed, voluntarily at first and later by our government as a wartime necessity, industry has been handicapped in comprehending the full impact of that discovery.

When the tremendous extent of the energy which can be released by nuclear fission was demonstrated by the first atomic bombs, the peoples of the world were deeply disturbed. Subsequent publicity led many to believe that we could expect an unlimited increase in the availability of energy in all forms, and fantastic new uses for this energy were predicted.

At present, eight years after the first atomic bomb, the outlook is becoming somewhat more realistic. The nature of energy from nuclear fission has been more clearly defined and some problems of utilizing this energy for peacetime civilian and industrial purposes are reasonably well understood. The veil of mystery is being lifted.

One immediate practical use of the potential heat available in atomic fuels now seems to be the generation

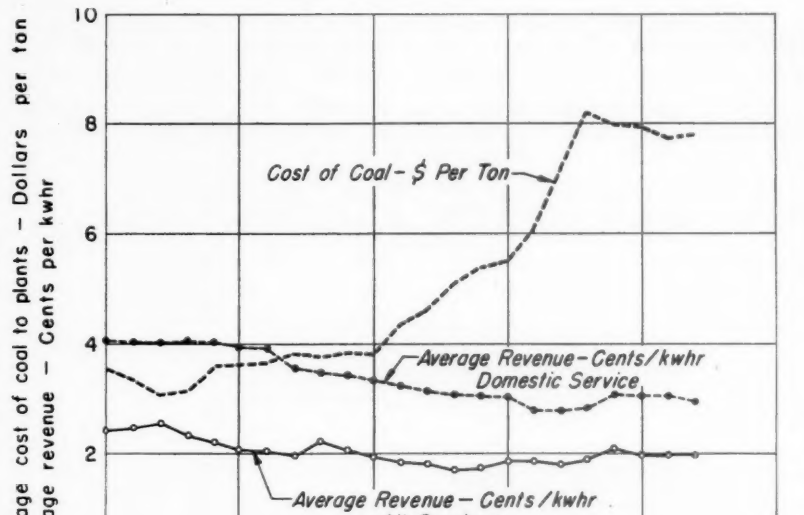



*Fig. 1—Comparison of Cost of Coal with Detroit Edison Revenue from Sale of Electricity.*

of steam, which can be used either for industrial heat processing or generation of electric power. Other possibilities are being thought about but as yet nothing equally practical has developed.

It follows, therefore, that the electric industry has both a fundamental interest and a definite responsibility. In making this statement and those which follow, I do so as an individual in a sincere endeavor to bring the whole matter into form and to help make clear the steps which must be taken before the heat from atomic fuels can become an important factor in industrial and civilian activities.

### Thermal Generation

From the standpoint of electric power, we should realize that approximately 74 per cent of all electric power used in the United States is produced by thermal generation and that thermal generation will be used more and more as time goes on. This is true for two main reasons; first for the strict economic sense and, second, because hydraulic resources are not extensive in much of the country. Those sites remaining are mostly in remote areas and therefore have a limited economic value. Even though there has been a tremendous increase of large hydroelectric installations built with public funds in recent years, the portion of electric energy generated by hydraulic energy in the United States has decreased in the past three decades from 38 per cent to 26 per cent.

Fuel resources in this country are abundant. Consequently, use of fuels for thermal generation has not been a problem. Areas more distant from coal mines or other fuel sources obviously incur a transportation cost differential; but, in any event, fuel has been readily available and will continue to be so for many years ahead. Substantial increases in the cost of fuel, however, have created an economic problem in the cost of generating electric power. This is illustrated by Fig. 1.

There are those parts of the world which do not enjoy the same degree of abundance of fuels, where energy resources are a critical matter. The Netherlands, Belgium, Italy, Brazil, Argentina, face particularly severe situations. Other countries which have large hydro resources, such as Norway, Sweden, Switzerland, and Austria, suffer troublesome economic problems because of lack of fuel needed to provide low cost heat for industrial processes and to permit a reasonable balance between thermal and hydro generation.

In addition, water power resources of many European nations which depend largely on hydraulic energy are rapidly becoming fully developed. Data assembled by the Power Section of the Economic Commission for Europe (United Nations) indicate that with the present rate of expansion in the use of electricity, Italy will have used up a large part of its hydro resources in 12 years and Switzerland, in 15 years. These are economic matters which give great urgency and incentive to development of atomic materials as a fuel.

### Atomic Energy Resources

Atomic fuels present a vast new source of heat energy. Data from studies sponsored by the Atomic Energy Commission indicate that uranium and thorium, the two most important elements involved, are widely scattered in ore deposits throughout the world. Although the ore in most cases contains only small percentages of these elements, it is estimated that at least 25,000,000 tons of uranium and 1,000,000 tons of thorium can be recovered economically.

Scientists tell us that under optimum conditions, one pound of uranium can furnish the same amount of heat energy as 1300 tons of coal and that under these conditions the heat energy available in the economically recoverable nuclear fuels is approximately 23 times as great as that available in the estimated fossil fuel deposits of the world. This is shown in Fig. 2, page 289.

Initial development of atomic energy came largely through research in university laboratories here and in Europe, with European scientists contributing very substantially.

As a wartime necessity, this development was taken over in 1942 by our government and the governments of our allies and carried forward under the cloak of great secrecy until the Hiroshima bomb explosion in August, 1945. Since January, 1947, atomic energy developments in the United States have been carried forward as a government monopoly under the Atomic Energy Commission, in accordance with provisions of the Atomic Energy Act of 1946. For national security reasons the retention of the policy of secrecy has been deemed essential and has been continued.

Atomic energy developments also have been carried on by other friendly nations, including Canada, Great Britain, France, Norway, Sweden, Switz-

erland, Belgium, The Netherlands, and Brazil. In most of these countries efforts have been directed largely to peacetime civilian and industrial applications.

Although the primary considerations in the development of atomic energy in the United States up to now have been military problems, substantial effort has been devoted to possible peacetime uses. This is particularly true with respect to radioisotopes which are used in many important ways. There has been an increasing effort to develop use of the heat energy potentialities of atomic materials within the last two or three years so that now the matter has assumed great importance. We can summarize the situation as follows:

1. The cost of heat energy in atomic fuels will be exceedingly low as compared with the cost of heat energy in conventional fuels. The nominal cost of one pound of uranium, having the heat equivalent of 1300 tons of coal is $35. It is thought that these atomic fuels may ultimately supplement present fossil fuels for some purposes, but it is not anticipated that they will supplant the use of conventional fuels.

2. It is physically possible now to generate steam for use in industrial processes and for the generation of electric power, using atomic fuels, if cost is not a first consideration. Test installations have been made at the Experimental Breeder Reactor at Arco, Ida., and the Homogeneous Reactor at Oak Ridge, Tenn., but full-sized reactors for the generation of electric power on a commercial basis have not been completely designed or built.

3. Atomic-powered engines for two submarines have been designed and one full scale prototype installation is now undergoing tests.

4. Development work on atomic-powered engines for a large naval vessel and an aircraft has been under way for some time.

5. Several industrial teams, under contracts with AEC, have made feasibility studies and all have reported (a) that the use of the heat of nuclear fission for the generation of electric power does appear to be practical, and (b) that substantial development is necessary before such power could be competitive commercially.

6. Several studies and projects are under way in which the objectives are to complete the preliminary design of reactors and their necessary appurtenances intended for commercial generation of electric power.

7. There is real and urgent need to carry this development forward. No one knows exactly what future developments may bring, but the accomplishment of practical industrial applications very probably will have important effects on the economic advances of our country and perhaps upon our national security.

8. This development could be carried forward by AEC at government expense under the present Atomic Energy Act or it could be carried forward by private industry using private capital, without great expense to government, if the present law is modified in several important respects.

9. Although great advances have been made, atomic energy development is still in its beginning and a great amount of research and development remains. The National Laboratories of AEC are the only facilities now available for much of this research, which would contribute both to our national security and to the economic advance of our country. Continued use of those laboratories in this effort is essential.

As stated previously, the development and construction of full-sized power reactors for the generation of electric power, in a broad sense, could be carried out (1) by private industry using private capital; (2) by the government, presumably by AEC, using government funds, or (3) by joint ventures in which both private industry and government would participate.

### Private Industry's Responsibility

In an economy like ours, based upon competitive enterprise, it is the responsibility of private industry to develop new scientific discoveries for the benefit of all. There are countless examples of this in minerals, transporation, petroleum, communications, medicines, agriculture, and industry in general.

While atomic energy has unique properties and far-reaching implications, fundamentally it is a new resource to be developed and put to work in the effort to lessen the physical burden on mankind. This clearly is the responsibility of competitive industry. Because the most promising use of atomic energy is in the generation of electric energy, the electric power industry, I believe, has not only a great responsibility but also a great opportunity.

If we look back for a moment we are aware that the electric power industry is the result of events that have taken place over a very long time. Man has known fire or heat energy

| *Fuel* | *World Reserves* | *Source of Data* | *Unit Energy* | *Total Energy Btu* |
|---|---|---|---|---|
| Crude Oil | 610 Billion Barrels | Weeks and Moulten | $6.4 \times 10^6$ | $35 \times 10^{17}$ |
| Natural Gasoline | 11.5 Billion Barrels | American Petroleum Institute | $6.4 \times 10^6$ | $0.74 \times 10^{17}$ |
| Shale Oil | 620 Billion Barrels | Bureau of Mines | $6.4 \times 10^6$ | $40 \times 10^{17}$ |
| Natural Gas | 560 Trillion Cubic Feet | American Gas Association | 1000 Btu Per Cu Ft | $6 \times 10^{17}$ |
| Coal | 3482 Billion Tons | Bureau of Mines | 13,500 Btu<br>14,000 Btu<br>9,000 Btu | $722 \times 10^{17}$ |
| TOTAL CONVENTIONAL | ..... | ..... | ..... | $80 \times 10^{18}$ |
| Uranium | 25 Million Tons | Raw Materials Division of AEC | $3.5 \times 10^6$ | $1700 \times 10^{18}$ at 1 to 1 Breeding |
| Thorium | 1 Million Tons | Raw Materials Division of AEC | $3.5 \times 10^6$ | $71 \times 10^{18}$ |
| TOTAL NEW FUEL | ..... | ..... | ..... | $1800 \times 10^{18}$ |

*Fig. 2—World Reserves of Fossil Fuel and Nuclear Energy*

for many thousand years. Probably the first industrial uses of fire were in prehistoric times to produce metals used for weapons. Although Hero built a primitive steam turbine in 130 B.C., it was not until Watt developed the first practical steam engine in 1769 that heat energy was harnessed to accomplish useful work.

Developments in the use of heat energy have come with increasing rapidity: steamships, locomotives, improved steam engines, internal combustion engines, modern steam, and gas turbines. These are the work and result of competitive industry and they have done much to give us tremendous industrial strength. Our unexcelled electric power systems, our abundance and exceedingly large use of electric power are some of the truly significant factors of that industrial strength.

Our present electric power position did not just happen. It was brought about primarily by competitive industry that had an opportunity to engage in our economic advancement and a responsibility to perform one of the important services which has made that advancement possible.

Those responsibilities of the electric power industry continue. Sufficient power supply must be provided for the areas served. New discoveries must be studied, developed, and adopted so that service is provided at the lowest possible cost consistent with sound business practices.

Atomic energy, or atomic fuels, offer a new source of heat energy which can be used to generate electric power. The problems are difficult and economic results may not be achieved for years to come. The efforts will be costly, but probably not as large as they might seem. Technical and economic problems will tax our human ingenuity but they must and will be solved.

It is the responsibility of the electric power industry to study and develop these possibilities in the same manner and with the same enterprise it developed the modern high-temperature high-pressure steam generators and turbines and high-voltage transmission lines.

The Atomic Energy Act of 1946 was an interim measure, intended to provide security until world conditions became stabilized and until the nature of atomic energy as a factor in our peacetime economy was more clearly established. Under this Act practically all atomic energy development to date has been by the government, although many of the activities have been performed by private industry under contract with the Atomic Energy Commission. There are those who believe this situation should continue. With some, this feeling is the result of genuine concern over defense and national security. Others believe that because the government has spent vast sums for the development, it should continue the monopoly for the benefit of "all the people." In other words, knowingly or otherwise, they are advocating a definite move toward socialism.

From past experiences we would expect that government development of atomic energy for commercial generation of electric power would result in the following:

1. Long time period of accomplishment.
2. Higher cost of accomplishment.
3. Greater expenditures by government.
4. Further extension of government in the area of private business.
5. Lessening of opportunity for the engagement of competitive industry.

### Joint Ventures

Proposals for joint ventures of various kinds have been suggested for development and construction of reactors for generation of electric power. The considerations supporting these proposals are not important to this discussion.

However, it is reasonable to believe that there are mutual aspects to the forward development for the utilization of atomic fuels. Certainly it will be necessary to use results of research already completed in our National Laboratories. Furthermore, much research currently in progress is directly related to large heat power reactors. A vast extent of additional research is needed before such reactors can be made commercially competitive. The research would benefit not one single effort, but rather the entire effort. Each development and advance, large or small, would be a step forward in the broad accomplishment of bringing atomic energy to what we hope is its ultimate useful place in our day-to-day economy.

In looking to the future, we should keep in mind that atomic energy as a science is still in its beginning. We have come a long way since the key to nuclear fission was finally found in 1939, but still we must solve even greater problems in putting this new resource to practical civilian uses.

We will not be able to determine what we can do with atomic fuels until we have built full-sized power reactors, tested their operation, and had opportunity to study and develop possible uses for products of such reactors.

Many scientific and technical problems yet to be resolved are of concern chiefly to government, largely in the field of weapons. Others are related primarily to industrial and civilian applications. It is recognized, however, that all of these problems are definitely inter-related and cannot be completely separated. For example, chemical or metallurgical processes to simplify refinement of fissionable materials for weapons would be important in connection with reactors for industrial applications.

Atomic energy development, therefore, should be carried forward on two broad fronts; one involving those matters of primary importance to government, and the other involving matters of greatest concern to industry. There should be the closest cooperation and coordination between the two efforts to avoid duplication and to assure that maximum results are obtained. In this way we should move forward rapidly and effectively.

From the standpoint of industry, and the electric power industry in particular, we should regard atomic materials as a new source of heat energy —a new fuel which may in the future effectively supplement present energy resources, keeping fully in mind that the value of fission products has a most important role in economic considerations.

Because the cost of fuel in many parts of the United States is one of the major components in the cost of generating electric power, electric power systems should undertake further study and development of this new energy resource. Though the initial efforts may not prove the commercial success of atomic fuels, we should develop the technical aspects as rapidly as possible. The restricted energy situation in many parts of the world, and our position in world lead-

ership, give added urgency to this effort.

The matter of fission products and their probable value and use cannot be passed over. Many of the problems involved concern security matters, but there is a real possibility that important uses will be found. Certainly the plutonium which could be produced in a breeder reactor would have substantial value as a fuel. Possible uses for other products have not been fully studied and until commercial reactors are built, and these products become available, this facet of the development cannot be fully explored.

The industry should continue to face this development with broad interest and effort. A single project carried to completion will not suffice. Preferably there should be several independent projects carried forward simultaneously, each guided by interested and responsible executives, experienced in the engineering, financial, legal, and administrative aspects of the electric power industry. Competition between groups will bring more of industry's talents into the over-all effort; it will produce creative thinking and speed the ultimate accomplishment.

When the present study, early research, and design phases are completed, and if these indicate that use of nuclear fuels could be competitive, with proper credit accruing for reactor products, the electric industry should actually carry out the construction, testing, and operation of full-sized reactors. It is only by building and operating such reactors that we will have opportunity to gain the needed experience in reactor technology or will have available fission products in sufficient quantities to determine how these materials may be put to commercially useful purposes in the market place.

This construction, testing, and experimentation, of course, will require the expenditure of substantial sums of money. This should be regarded in the same light as other research and development efforts, which have been continuously carried on since the beginnings of the industry, now nearly three-quarters of a century old.

If directed effort is exerted, initial projects could come into service within ten years, and perhaps sooner. The first installations obviously will be experimental and exploratory, but they will help solve many problems. These installations may be complete generating stations or may consist of only the reactors and necessary appurtenances which would permit thorough tests of the reactors and their operation. Certainly such reactors would be so designed and constructed that electric generating facilities would be added as technology and economics justify. Succeeding installations should be improved units. It is reasonable to expect proven workable installations within ten to 15 years.

### Cost Considerations

Perhaps the most important consideration in carrying forward such a program is the matter of costs and by whom these costs should be borne. I have indicated that I believe development of atomic fuels for the generation of electric power is rightfully the responsibility of the electric industry. It follows, therefore, that the electric industry should largely assume the costs of the development. The industry, in this sense, includes not only electric power systems themselves, but also power equipment manufacturers, the engineering and construction fields, power consumers, and others who are interested in maintaining high standards of electric service at the lowest practical costs. All of these should benefit from the development and all should share in the undertaking.

In the matter of research and development, there are areas where the problems of interest to government and those of interest to industry cannot be completely delineated. These matters, in most instances, can be studied only with unusual facilities as are available in the AEC National Laboratories alone. The results of these studies would be of value to the entire atomic energy development.

Much of this work justifiably could be undertaken by government, but this is not necessarily the case. While the costs in question might be substantial, they would represent only a small part of either the total AEC budget, or the total cost of a practical reactor project. Certainly, this is a matter of proper understanding.

It is well recognized that the Atomic Energy Act of 1946 provides a government monopoly in the field of atomic energy. If private industry is to engage freely and actively in this development, it is essential that rights of ownership be given to private industry, so that there may be normal opportunity to recover investments and to profit from efforts. This is the usual practice which makes it possible for business and industry to exist and expand.

Thermal electric power generating stations ordinarily have an economic life in excess of 25 years. Those investing private capital in a plant to use atomic fuels would need to know that they could have full control of the plant for its useful life. They would need to know that they could obtain the necessary atomic materials for fuel and could sell or dispose of fission products through the normal channels of commerce.

To bring about these conditions the Atomic Energy Act should be amended to permit private enterprise to do the following:

1. To build, own, and operate atomic energy plants.
2. To acquire, own, and dispose of fissionable materials.
3. To acquire, own, and dispose of source materials.
4. To sell and distribute end products and by-products produced in an atomic energy facility.
5. To obtain licenses from the Atomic Energy Commission subject only to the requirement that operations thereunder be conducted in compliance with conditions set forth in the license, in accord with standards to be prescribed by the Act.
6. To attain normal patent and trade secret protection subject only to full disclosure to the commission for its own use for purposes of protection of national security.

The national security and safety aspects of the atomic energy situation are fully recognized in suggesting the above modifications of the law. Obviously, present security regulations create difficult situations. We have not found these intolerable and believe it possible to continue under present conditions. Licensing arrangements, subject to cancellation only for failure to comply with terms of the law, could assure that fissionable materials and classified information do not pass into possession of unfriendly hands.

I wish to emphasize that the elec-

(*Continued on page* 294)

# A Report of the Edison Electric Institute Committee on Atomic Power

**Edgar H. Dixon**
*President, Middle South Utilities, Incorporated*

Presented by the Committee's Chairman before the Twenty-First Annual Convention of the Edison Electric Institute, Atlantic City, N. J., June 4, 1953

In September, 1952, a Special Committee on Atomic Energy was appointed at the Edison Electric Institute Presidents' Conference in New York. This committee was comprised of Philip Sporn, Chairman, James B. Black, Walker Cisler, and J. W. McAfee, all of whom have been taking an active interest in the furtherance of this country's atomic power program. In accordance with the recommendation of the Special Committee, the Edison Electric Institute Board on February 25, 1953, appointed a Standing Committee on Atomic Power, with instructions to report at the annual EEI convention. That report follows.

EDGAR H. DIXON

The electric power industry has an important interest in the plans and operations of the Atomic Energy Commission regarding the production of fissionable materials for several reasons. To begin with, these activities, and particularly the gaseous diffusion plant operations, require very large quantities of electric power to the point where the Atomic Energy Commission is today the world's largest single user of electric energy. In the case of the gaseous diffusion plant at Paducah, Ky., five investor-owned companies formed Electric Energy, Inc., which will supply 6,000,000,000 kwhr a year, or 38 per cent of the required electric energy; the balance will be supplied by the Tennessee Valley Authority. In the case of the gaseous diffusion plant under construction at Portsmouth, Ohio, 15 electric power companies combined to form Ohio Valley Electric Corp., which will supply the total requirements of 15,000,000,000 kwhr per year.

The electric power industry has a further special interest in the plans and program of the Atomic Energy Commission for developing atomic power. This derives from the prospect of utilizing atomic power economically at central stations, with fissionable materials replacing conventional fuels, and nuclear reactors and heat transfer systems replacing conventional boilers. Commercial utilization of nuclear energy in this manner could result in important conservation of the nation's reserve of fossil fuels, a highly desirable long-range objective. Moreover, this potential source of fuel may ultimately provide means for reducing fuel costs at central stations. Exploring this source of fuel thus would appear to be an integral part of the everyday activities of our industry in seeking to lower fuel costs—conventional or otherwise—for the continuing benefit of the public.

Another area of special interest to the electric power industry regarding atomic energy relates to the responsibility and obligation of free enterprise and private capital to further the development of nuclear power sources and the related production of fissionable materials. In this way we can possibly take part in devising more economical methods of producing fissionable materials for national defense, and also assist in creating continuing production of and a commercial market for these products.

We are, of course, aware of the great national prestige that this country would obtain if it should succeed in becoming the first nation to produce electric energy from nuclear fuel on a commercial basis. Likewise, we recognize that in order that our customers may share in the benefits of commercial application of atomic power to electricity production, if achieved, the development of this important energy source must have the active support and leadership of competitive enterprise.

In light of the stimulation that the subject of atomic power for commercial use has been receiving lately, and its prospective potential development, the problem facing power industry members, and particularly electric power companies, has been to appraise what can be done within the limitations of the Atomic Energy Act of 1946, which restricts ownership of fissionable materials and facilities for producing them to the Federal government.

Soon after passage of the McMahon Act, our industry began to study and take part in the Atomic Energy Commission's program. In 1951 the commission accepted into the program four industrial groups for the purpose of studying the practicability of private investment in the nuclear power field. Each group is managed or co-managed by an investor-owned utility company. A fifth group recently was authorized and has initiated activities.

Last year the four original groups reported their initial findings to the commission and one group has been authorized to proceed with the second stage of its study, consisting primarily of developing a nuclear reactor to produce power. The two primary participants in this group have been empowered to have asso-

ciated with them 25 additional companies in connection with this project. Of these companies, 18 are electric power companies.

The Atomic Energy Commission has stated publicly that other companies able to contribute to development work on this project may become associated with it, with the commission reserving the right to designate or approve additional associated companies. Should more companies than can be accommodated desire to join this particular project, the commission would consider their affiliation with other existing study teams or the creation of new teams. Thus, within present limits of the McMahon Act, an opportunity exists for bringing into this new field still more separate units of the electric power industry which may wish to participate.

As progress is being made along these lines, numerous business and government leaders are seeking revision of the Atomic Energy Act to permit industry to own fissionable materials and facilities for the production and utilization of such materials, to deal fairly with patent protection for new developments, etc. These leaders advocate that considerably broader participation and use of private capital in the atomic power program would result if handicaps existing under the present law were removed.

Many industries other than the electric power industry have a legitimate interest in commercial development of the atom. Outstanding among these are the mechanical and electrical equipment industry and the chemical industry. It needs to be pointed out, however, that both of these industries, to a greater extent than the power industry or industry in general, are now participating in the atomic program either as private enterprisers or as contractors to the commission on a cost, cost-plus fee, or cost-plus profit basis. It should be emphasized that all of these groups, highly important as they are to the national economy, basically are differently constituted with regard to one or two important elements of participation in atomic power. We refer to the question of keeping secret their operations from their competitors, and to patents.

With regard to both of these factors, the power industry is unique. Having a traditionally long-standing lack of interest in patents, the industry is known for its complete disclosure of plans, specifications, methods, procedures, and experience for the benefit of the public.

In speaking of other industries, it may be appropriate to point out that the National Association of Manufacturers has been actively following the atomic energy program and has committees hard at work on the subject. A new, important association in the field is The Atomic Industrial Forum, Inc., which expects to have as members a number of leading companies and service organizations active or interested in atomic energy work. The goals of this organization may be summarized briefly as "bringing together in one place information so that there can be an advancement of understanding of the technical, the legal, the economic, and the managerial problems which are involved."

The National Association of Railroad and Utility Commissioners now has a committee studying problems of regulation arising from participation by the electric power industry in atomic power development.

In addition, the Bar Association of the City of New York has for several years had an active committee on atomic energy working in consultation with representatives of the Joint

## Text of Mr. Sammis' Letter to the AEC

*The following is the text of a letter, dated June 4, 1953, sent to the U. S. Atomic Energy Commission by Walter H. Sammis, newly-elected President of the Edison Electric Institute.*

THE large segment of the investor-owned electric power industry represented by membership in the Edison Electric Institute wishes to express to the Atomic Energy Commission its active and legitimate interest in atomic power prospects and development of these by the electric power industry for the benefit of the public.

The commission is, of course, familiar with the substantial efforts of the electric power industry in supplying large quantities of energy to many of the commission's installations. In addition, the industry desires to develop fully the possibilities of commercial use of nuclear energy in power production with a long-term view toward reducing fuel costs as well as conserving the nation's reserve of fossil fuels. Moreover, the industry is desirous of aiding in the development of more economical means of producing fissionable materials and in creating a continuing commercial market for these products.

As early as 1946, the electric power industry set up a Commitee on Appraisal to explore this subject. At the invitation of and with the full cooperation of the commission, four utility teams have carried out appraisal programs, one of which has been expanded to include a large number of electric utility companies. In the same manner a fifth study group recently was formed.

A number of power companies have personnel assigned to various national laboratories—the Argonne National Laboratory, the Knolls Atomic Power Laboratory, the National Reactor Testing Station, the Oak Ridge Institute of Nuclear Studies, etc.—and the industry is spending considerable sums of money in this work.

From its long experience in power development, the industry has available qualified personnel to participate in the adaptation of atomic energy to power uses.

The industry favors every effort toward advancing the solution of problems involved in developing commercial and economical atomic power. The industry is appreciative of the attitude of the commission in encouraging additional companies, which can make a contribution to development work on atomic power projects, to become associated with existing study groups or to apply for the formation of new groups.

While at the present time the success of the atomic power program seems to be best assured by individual companies or groups working with the commission, the industry also is prepared to attempt to work out the handling of matters relating to the development of atomic power on an industry-wide basis. The industry traditionally has shared the experience and information gathered by any one member with all other members for the benefit of the public. Historically, this same attitude has prevailed in our dealings with the many branches of engineering and manufacturing associated with the electric power industry.

To maintain and strengthen industry-wide relations with the Atomic Energy Commission, and with other industries participating in the atomic power development program, the Edison Electric Institute has established a standing Committee on Atomic Power. This committee stands ready to meet with you and to lend assistance to the commission in furthering these developments.

Congressional Committee on Atomic Energy and of the Atomic Energy Commission itself.

The EEI Standing Committee on Atomic Power believes that a definite and firm approach should be made to the Atomic Energy Commission by that part of the electric power industry for which the Edison Electric Institute can speak.

The object of this approach is:

1. To assure the commission of the industry's legitimate and active interest in the development of atomic power;
2. To point out to the commission that the industry, from its long experience in power development, has available qualified personnel to participate in the adaptation of atomic energy to power uses;
3. To obtain a full opportunity for the industry to maintain a position so that members of the industry can singly, in groups, or as an industry, participate effectively in the development of atomic energy for power generation; and
4. To request that the commission continue to cooperate with and assist those firms in the public utility industry which are now or may later become actively engaged in atomic power studies.

The committee recommends that a letter embodying these principles be sent by the Edison Electric Institute to the Atomic Energy Commission and that a copy be sent to the Joint Congressional Committee on Atomic Energy.

**Committee Members**

J. B. Black, President, Pacific Gas and Electric Co.
W. L. Cisler, President, The Detroit Edison Co.
George M. Gadsby, President, Utah Power & Light Co.
Allen S. King, Executive Vice President, Northern States Power Co.
E. L. Lindseth, President, The Cleveland Electric Illuminating Co.
J. W. McAfee, President, Union Electric Co. of Missouri
C. B. McManus, President, The Southern Co.
I. L. Moore, President, New England Electric System
R. G. Rincliffe, President, Philadelphia Electric Co.
H. R. Searing, President, Consolidated Edison Co. of New York, Inc.
Philip Sporn, President, American Gas and Electric Co.
Edgar H. Dixon, *Chairman*, President, Middle South Utilities, Inc.

# Building Profitable Load

(*Continued from page* 254)

In the five-year period from 1942 to 1947 this system showed an increase of from 1543 to 2319 kwhr per year per residential customer, an increase of 776 kwhr over the five-year period or an average of 155 kwhr per year. In the five years from 1947 to 1952 the kilowatthours per residential customer increased from 2319 to 4106, an increase of 1787 or an average of 357 kwhr. This is an accomplishment so outstanding that it deserves further study.

An analysis of the monthly sales by classes of customers shows that whereas the sales were fairly uniform throughout the year in 1942, the variation between summer and winter in 1952 is very pronounced. The sales to all classes of customers in 1952 were higher in the winter than in the summer, although this condition was most pronounced in the residential classification. Residential sales in December were 226.6 million kwhr, or 81.1 per cent, higher than the sales in July. The total sales in December were 288.8 million kwhr higher than in July (see cut, p. 295).

Of course, the system referred to is the TVA. The saturation of electric house heating in 1942 was less than 1 per cent. Certain parts of that system, notably Memphis, have attempted to discourage house heating, but other components of the system have allowed the load to grow without direction and without proper rate design. As a result, the saturation of electric house heating reached between 8 and 10 per cent in 1952 with devastating results to system load factor. Any sales manager who permitted a situation similar to this to occur in a business-managed, tax-paying utility would have sold his company into receivership.

A similar situation, on a much smaller scale, and less pronounced in its effect is developing in many companies where—due to lack of information, pressure from the manufacturers, or prejudice on the part of a sales manager—the load-building program is tending to produce a lower load factor.

The situation in any electric system never remains static. It is constantly changing. One appliance may produce very desirable characteristics this year but two years from now it may have a much greater peak responsibility. By constant careful analysis of load conditions on his own system and reference to typical load curves of various appliances, the sales manager can shift the emphasis from one appliance having a less favorable to one having a more favorable load characteristic.

Opportunities for load balancing for improved load factor are also present in the industrial and commercial classifications. Conditions vary so widely in these fields that it is difficult to prepare any generalized data. Frequent opportunities for load-factor improvement will be discovered if the sales personnel dealing with such customers are fully acquainted with the program.

Selling for improved load factor is the third and final phase of building profitable load.

# Atomic Electric Power

(*Continued from page* 291)

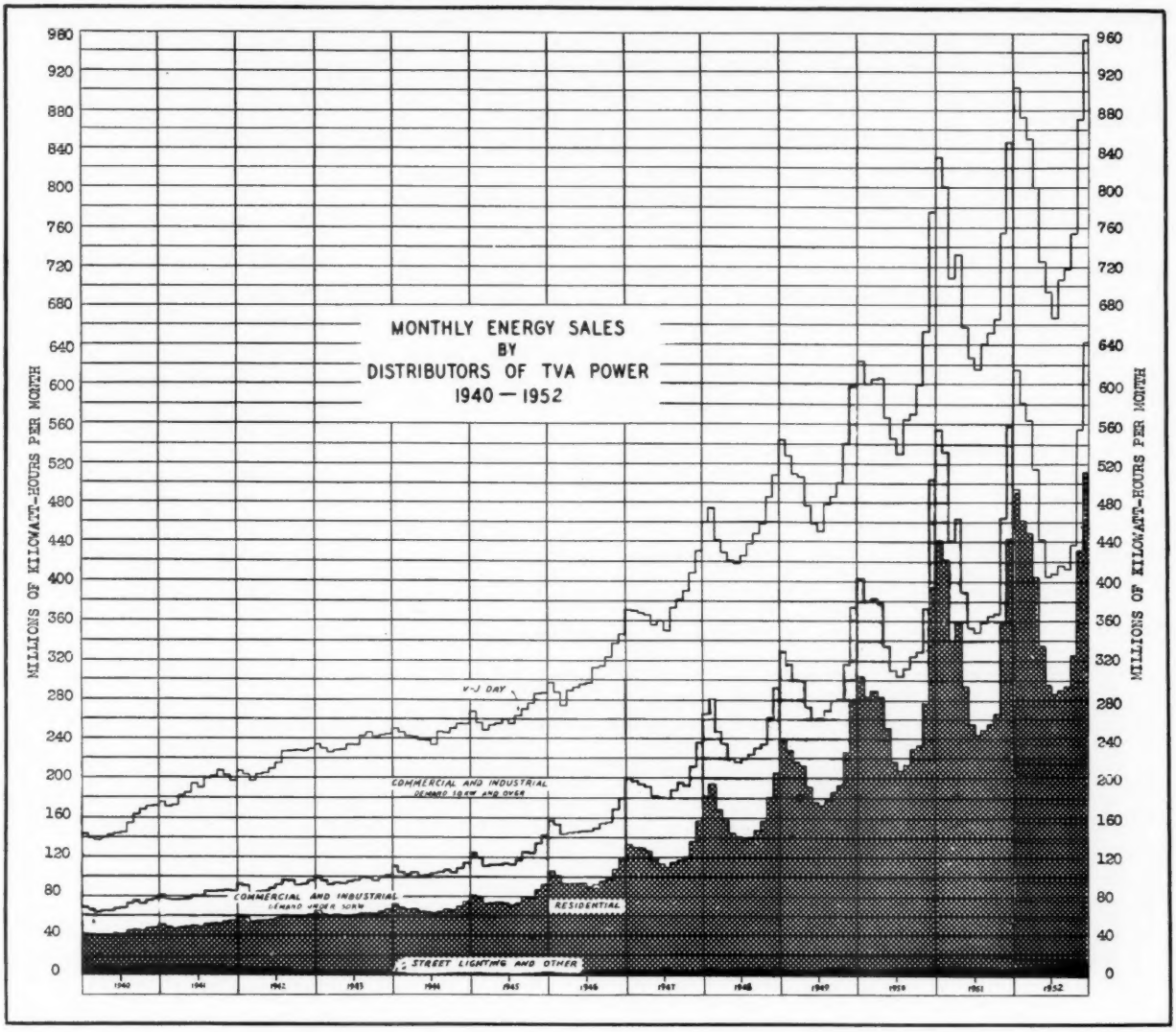
tric industry has advanced tremendously in the 75 years since its inception. We foresee continued year-to-year advancement and accomplishment in providing economical service.

Atomic energy first took on real significance in 1939 when scientists unlocked the secret to nuclear fission, and in intervening years we have gone far in understanding this discovery.

Atomic energy will achieve its proper place as a useful servant in our civilization only when industry succeeds in harnessing and directing it to useful civilian purposes. Industry in general, and the electric industry in particular, recognizes the potentialities of this new found source of energy.

The American competitive industrial system is the world's finest, encompassing as it does the skill of people, technical, and scientific know-how, great facilities, investment of capital, and the rightful place of government. We should endeavor to mobilize all these constructively, effectively, and economically to bring about peacetime use of atomic energy and thereby a still better and more peaceful world of the future. The challenge is great indeed.

## Monthly Energy Sales by Distributors of TVA Power




# *Personals*

**George A. Donald,** President and General Manager, Lake Superior District Power Co., has been installed as President of the Wisconsin Utilities Association, succeeding **Theron A. Brown,** Madison Gas & Electric Co. **Harold P. Taylor,** Vice President and Treasurer, Wisconsin Public Service Corp., succeeded Mr. Donald as Vice President of the association; and **Harold P. Chamberlin,** Assistant Secretary and Assistant Treasurer, Wisconsin Electric Power Co., was re-elected Treasurer.

Mr. Donald, a graduate of the University of Minnesota, joined the Lake Superior District Power Co. in 1920 and served in various capacities before becoming president of the company in 1951.

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**Robert R. Habberley,** Vice President, Western Massachusetts Electric Co., has been named Vice President in Charge of Operations. Other organizational changes within the company include the promotion of **Edward T. Augustine,** Assistant General Superintendent, to General Superintendent; **Willard D. Fessenden,** Cashier and Assistant Tax Consultant, to Assistant Treasurer; and **Allen Abercrombie,** Office Manager and Chief Accountant of the Central Division, to Assistant Treasurer.

Mr. Habberley, who has been a vice president for the past three years, previously held the positions of assistant general superintendent and director of engineering. He joined the company's engineering department in 1930.

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**Willard A. Gallotte,** Engineer in Charge of Transmission and Distribution in the General Engineering Department of Puget Sound Power & Light Co., has been promoted to Supervisor of Engineering upon the retirement of **Magnus Crawford,** Chief Engineer.

Mr. Gallotte, who has been em-

ployed by Puget Power for 26 years, is a graduate of Worcester Polytechnic Institute. Before joining the company he was a mathematics instructor at Worcester Polytechnic Institute and a student engineer for Westinghouse.

Mr. Crawford, who holds degrees from Dupont Manual Training School and the University of Washington, became a draftsman and designer in 1906 for the Seattle-Tacoma Power Co., one of five systems to be consolidated in 1912 as Puget Power. He held in succession the titles of assistant engineer, superintendent of transmission, superintendent of distribution, general superintendent of the Central Division, assistant chief engineer, and chief engineer.

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**Peter Barry,** Assistant Superintendent of the Steam Distribution Department, Rochester Gas and Electric Co., has been promoted to Safety Director.

# Annual EEI Convention

(*Continued from page* 224)

said, and he cited the Convention Program Committee, composed of D. S. Kennedy, President of Oklahoma Gas and Electric Co., Chairman, Harrlee Branch, Jr., President of Georgia Power Co., and Walker L. Cisler, President of The Detroit Edison Co., for their outstanding work. Special tribute was also paid to Institute Managing Director H. S. Bennion for his unceasing devotion to industry advancement and for his invaluable counsel and guidance, based upon his profound knowledge of industry operations.

Appreciation was expressed to Bendix Home Appliances and General Electric Co. for their contributions to the meeting's success and to the members of Atlantic City Electric Co. who so ably handled convention details. *Electrical World* likewise received special commendation for publishing the *Unconventional Daily*, with its excellent newspaper coverage of convention events and personalities.

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## Convention Panel Talks Available from Institute

THE panel discussions on "The Financial Outlook as It Affects Public Utilities" and "What Companies Are Doing in Developing Leaders" presented on Wednesday morning and afternoon, respectively, at the recent EEI Convention will not appear in the BULLETIN but are available upon request to the Institute, 420 Lexington Ave., New York 17, N. Y.

All other convention addresses are published in this issue in the order of their presentation during the general sessions.

# CONVENTIONS AND MEETINGS

1953

**JULY**

14 NARUC Accounts and Statistics Committee, Louisville, Ky.

17 EEI Industrial Relations Committee, in conjunction with Personnel Section, Wisconsin Utilities Association, Green Bay, Wis.

**AUGUST**

5-8 International Association Electric League's 18th Annual Meeting, Fairmont Hotel, San Francisco, Calif.

**SEPTEMBER**

3- 4 EEI Commercial Sales Section Committees, EEI Headquarters, New York, N. Y.

14-18 IES National Technical Conference, Commodore Hotel, New York, N. Y.

15-18 EEI-AGA Accounting Division Organization Meeting, Hotel Statler, Detroit, Mich.

17-20 Public Utilities Association of Virginias' Annual Meeting, Greenbrier, White Sulphur Springs, W. Va.

18-19 Maryland Utilities Association Fall Conference, Cavalier Hotel, Virginia Beach, Va.

20-23 Rocky Mountain Electric Association 50th Annual Fall Convention, Broadmoor Hotel, Colorado Springs, Colo.

20-26 NARUC Convention, Hotel Roosevelt, New York, N. Y.

21-22 EEI Accident Prevention Committee, Radisson Hotel, Minneapolis, Minn.

21-26 International Association Electrical Inspectors, Silver Jubilee Meeting, Edgewater Beach Hotel, Chicago, Ill.

22 EEI Purchasing and Stores Executive Committee, EEI Headquarters, New York, N. Y.

1953

**SEPTEMBER**

27-30 Controllers Institute of America, Annual Meeting, Hotel Statler, Boston, Mass.

**OCTOBER**

5- 6 EEI Prime Movers Committee, Detroit, Mich.

7- 9 Indiana Electric Association Annual Convention, French Lick Springs Hotel, French Lick, Ind.

8- 9 EEI Transmission and Distribution Committee, Hotel Nicollet, Minneapolis, Minn.

12-14 Annual Round-Table Conference, EEI Industrial Relations Committee, Sheraton Hotel, Chicago, Ill.

12-13 Iowa Utilities Association Management Conference, Hotel Fort Des Moines, Des Moines, Iowa.

19-21 ASA 4th National Standardization Conference and 35th Annual Meeting, Waldorf-Astoria, New York, N. Y.

19-21 EEI Meter and Service Committee, William Penn Hotel, Pittsburgh, Pa.

19-23 ASCE Annual Convention, Hotel Statler, New York, N. Y.

21 PIP Steering Committee, Edgewater Beach Hotel, Chicago, Ill.

22-23 PIP Workshop, Edgewater Beach Hotel, Chicago, Ill.

**NOVEMBER**

2- 3 EEI Electrical Equipment Committee, Jung Hotel, New Orleans, La.

11-13 Wisconsin Utilities Association, Electric and Gas Section, Hotel Schroeder, Milwaukee, Wis.

19-20 Pacific Coast Electrical Association Annual Hawaiian Conference, Honolulu, T. H.

# EDISON ELECTRIC INSTITUTE OFFICERS AND COMMITTEES

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